



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ECO-INDUSTRIAL PARKS

ACHIEVEMENTS AND KEY INSIGHTS FROM THE
GLOBAL RECP PROGRAMME **2012–2018**



INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT

ACKNOWLEDGEMENTS

UNIDO would like to express its gratitude to the institutions and professionals that contributed to the EIP Pilot Projects, which in turn helped to form the foundations of this publication. Special acknowledgements go to: The **National Cleaner Production Centres** that contributed to creating a common understanding of EIPs through the testing and implementation of EIP methods and the provision of EIP support in the pilot countries. **National, regional, and local stakeholders** from the public and private sectors who contributed to the EIP work in the pilot countries.

International stakeholders – in particular the World Bank Group (WBG) and Deutsche Gesellschaft für Internationale Zusammenarbeit (German Development Cooperation) (GIZ) GmbH – that collaborated with UNIDO to create a common understanding of EIP through the provision of support in the development of EIP implementation methods.

All UNIDO team members from the Department of Environment at UNIDO Headquarters and the UNIDO country offices who collaborated on the EIP Pilot Projects.

The **international and national experts/consultants** that supported the development and implementation of specific assignments as part of the EIP Pilot Projects.

Core authors: Dick van Beers, Frédéric Meylan, Alessandro Flammini, and Leisa Burrell.

Contributors and reviewers: Petra Schwager, Jérôme Stucki, and Cesar Barahona.

UNIDO leadership: Smail Alhilali (Chief, Emerging Compliance Regimes Division), Nilgun Tas (Chief and Deputy Director, Industrial Resource Efficiency Division), and Stephan Sicars (Director of the Department of Environment).

Graphic design: Joker Design

© Photos: Provided by partners.

The EIP work stream under the Global Resource Efficient and Cleaner Production (RECP) Programme was made possible by funding provided by the Swiss Government through State Secretariat for Economic Affairs of Switzerland (SECO).

The EIP work benefited greatly from the institutional contributions to this topic from RECPnet and its members (www.recenet.org).



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
State Secretariat for Economic Affairs SECO

CONTENTS



Acknowledgements	2
This publication	4
1) Introduction to eco-industrial parks	5
Moving beyond traditional industrial parks	5
The case for and benefits of eco-industrial parks	6
Definition	7
What are the key components of eco-industrial parks?	8
2) EIP Pilot Projects explained	9
The Global RECP Programme	9
EIP support in pilot countries	11
3) Managing for results: from activities to impacts	16
4) Creating a common understanding and implementation methods	19
Overview	19
Why is it important to work on eco-industrial parks?	20
Where do we stand regarding international EIP practice?	21
What do we mean by eco-industrial parks?	22
How can we implement eco-industrial parks?	23
5) Highlights from pilot countries	26
Scoping EIP interventions	26
Awareness-raising	28
Policy support	29
Park management	31
Resource efficient and cleaner production	33
Industrial synergies	35
Performance monitoring and benchmarking	37
Capacity-building	39
Contribution of EIPs to (sustainable) cities	40
Spatial planning and zoning	42
6) Key insights from the EIP Pilot Projects	44
7) What's next?	48
The case for scaling-up the EIP Pilot Projects	48
The Global Eco-Industrial Parks Programme (GEIPP)	48
Expanding into sustainable cities	50
What can UNIDO offer?	52

ABOUT THIS PUBLICATION

This publication presents the key results and insights stemming from the work undertaken as part of the pilot projects on eco-industrial parks (EIPs), managed by UNIDO in the period from 2012 to 2018, as part of the Global RECP Programme, which was funded by Switzerland.



1 INTRODUCTION TO ECO-INDUSTRIAL PARKS

Moving beyond traditional industrial parks

Industrial parks have long been recognized as an efficient means of unifying industrial activities with business, infrastructure and service objectives. The term “industrial parks” in this publication is used to denote a range of co-located industrial activities.

Similar terms such as industrial zones, industrial investment regions, special economic zones and industrial corridors, differ only marginally in their application to industrial parks. Regardless of the label applied, they share many commonalities, in that they are planned and developed with the objective of fostering economic growth and of improving a location’s competitiveness through potential collaborative and efficiency gains.

Industrial parks and its associated terms also share a common attribute in that they all typically fail to account for and address the environmental and social externalities stemming from their activities.

Hence, in the context of mounting pressure to address climate change and foster international development, it is becoming increasingly clear that industrial parks need to move beyond their traditional resource intensive business models to integrate environmental and social dimensions to remain a frontrunner in the economic activities in their respective countries.

The case for and benefits of eco-industrial parks

As developing and emerging economies seek to increase industrial output, there is also a pressing need to decouple economic growth from resource consumption to meet wider social objectives. In this regard, there is very real need to strategically plan and effectively manage industrial parks to help achieve desired economic, social, and environmental targets. As a result, the transformation of conventional industrial parks into EIPs presents an effective opportunity to attain inclusive and sustainable industrial development and to meeting the objectives of the 2030 Agenda and the Sustainable Development Goals (SDGs).

International best practice illustrates that the types of economic, environmental, and social benefits from EIPs vary greatly, transcending conventional business case benefits^{1,2}.

EIPs enable companies to benefit from greater collaboration between companies, service providers and local communities, allowing companies to transform environmental problems into efficiency gains, by using resources more effectively and enabling companies to draw on common services and infrastructure.

The **ECONOMIC BENEFITS** generated by EIPs include employment creation through measures such as the application of eco-innovations and industrial collaboration. Increased business competitiveness is one of the most significant drivers for the development of EIPs, as industries that operate in well-designed and well-managed parks can take advantage of resource efficiencies, reductions in waste disposal, value-addition and risk-mitigation, as well as of other available services, leading to cost savings. Some EIPs have also reported higher levels of foreign direct investment.

The indirect benefits of EIPs can be more difficult to quantify, but are crucial to the long-term economic sustainability of the park. These include indirect employment creation through skills upgrading and training, technology transfer, improved reputation and increased incidence of the “demonstration effect” arising from the application of best practice, leading to wider uptake of more efficient practices.

The **ENVIRONMENTAL BENEFITS** of EIPs are diverse and include reduced levels of pollution due to more efficient use of resources (raw materials, water, energy) and the reduction, reuse and recycling of waste, which can contribute to the preservation and protection of local biodiversity. Additionally, improved management of chemical and hazardous substances in EIPs can lead to additional environmental benefits and greater worker safety.

The **SOCIAL BENEFITS** deriving from EIP activities can catalyze the creation of quality local jobs through better working conditions. EIPs also work to enhance local community well-being through better community outreach, with some EIPs working towards increased rates of gender equality, through for instance the creation of employment for women and dedicated facilities for female workers. Better security features help to mitigate crime, creating a greater sense of security for workers. EIPs often support surrounding communities, through the creation of a social infrastructure such as vocational training centres, skills development training, as well as the provision of broader community services.

1 Van Berkel, R. (2006). Regional resource synergies for sustainable development in heavy industrial areas: An overview of opportunities and experiences. Curtin University of Technology, Perth, Australia.

2 WBG (2016). Mainstreaming eco-industrial parks. World Bank Group, Washington, USA.

Definition

Throughout the world, approaches to the development of EIPs are characterized by different definitions, classifications and contexts. The figure below presents combinations of commonly-used terminology that directly or indirectly relate to the concept and practice of EIPs.

A UNIDO study of EIP practices³ drew the following conclusions:

- EIPs mean different things to different parties;
- Practice does not yet match ambition;
- Process and continuous improvement-based approaches appear most useful;
- Lack of experience, awareness, supporting regulations and their enforcement slow down the development and implementation of EIPs;
- Many examples of good practice exist, yet they need to be consolidated and implemented routinely in the planning, development and management of industrial parks.

The following definition, commonly employed by UNIDO, recognizes the importance of the three pillars of sustainable development and of integrating EIP considerations into all phases of the development and operations of industrial parks:

“A community of manufacturing and service businesses located together on a common property. Member businesses seek enhanced environmental, economic, and social performance through collaboration in managing environmental and resource issues.”⁴



Figure 1: Combination of terminologies used internationally in relation to EIPs⁵

³ UNIDO (2016). Global assessment of eco-industrial parks in developing and emerging countries: Achievements, good practices and lessons learned from thirty-three industrial parks in twelve selected emerging and developing countries. United Nations Industrial Development Organization, Vienna, Austria.

⁴ Lowe, E.A. (2001). Eco-industrial parks: A handbook. Asian Development Bank, Manila, Philippines.

⁵ UNIDO, WBG, GIZ (2017). An International Framework for Eco-Industrial Parks.

<http://documents.worldbank.org/curated/en/429091513840815462/An-international-framework-for-eco-industrial-parks>

What are the key components of eco-industrial parks?

An overall framework for describing EIPs is presented in the following figure from the International Framework on EIPs, jointly developed by UNIDO, World Bank and GIZ⁶. The framework describes the performance requirements for EIPs grounded in four key categories, namely: park management performance; environmental performance; social performance; and economic performance. The framework provides the basis for defining and setting prerequisites and performance requirements for EIPs.

Compliance with national and local regulations is a fundamental and common requirement of all industrial parks, regardless of the geographical location or specific characteristics of the park. However, EIPs should go beyond compliance with local and national regulations on environmental and social requirements (“compliance+”).

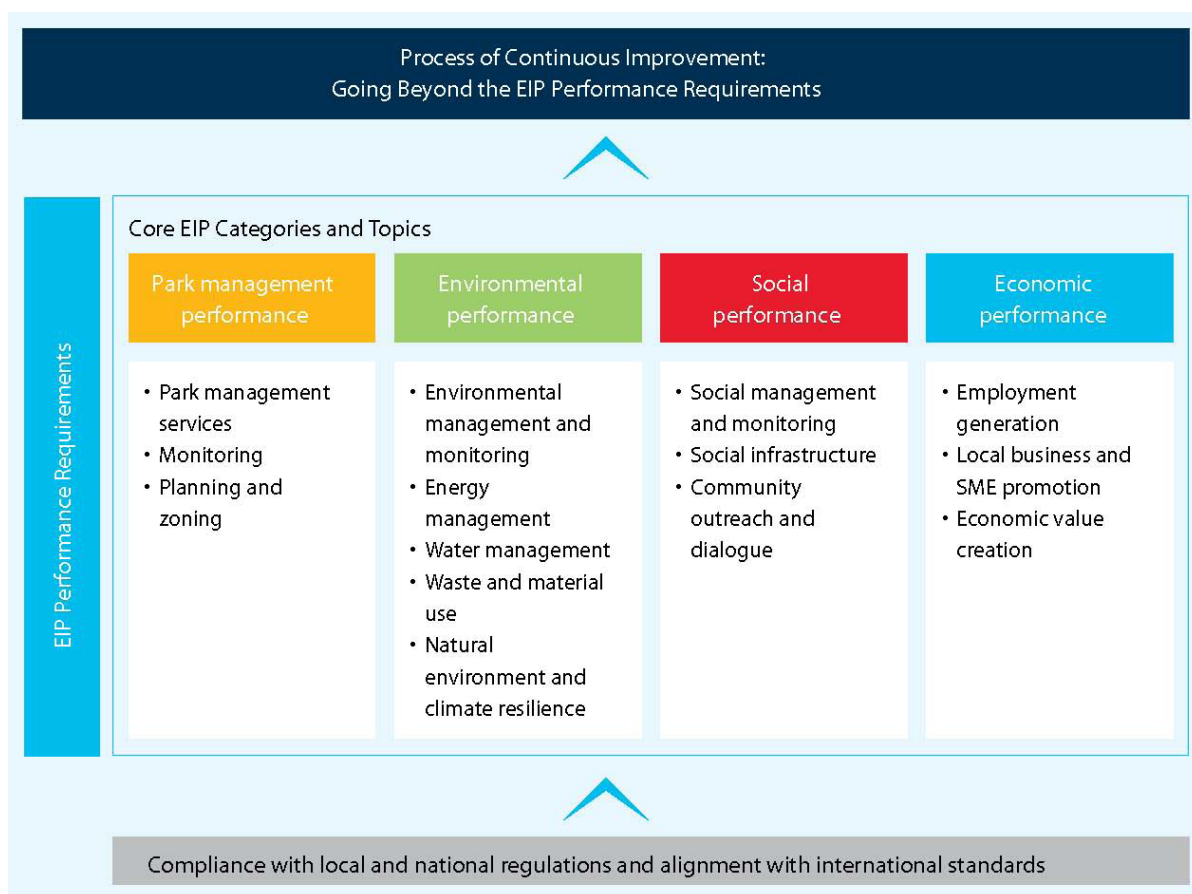


Figure 2: Overall framework for describing EIPs⁶

⁶ UNIDO, WBG, GIZ (2017). An International Framework for Eco-Industrial Parks. <http://documents.worldbank.org/curated/en/429091513840815462/An-international-framework-for-eco-industrial-parks>

2 EIP PILOT PROJECTS EXPLAINED

The United Nations Industrial Development Organization (UNIDO) is a specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability. UNIDO aims to contribute to inclusive and sustainable industrial development by improving the environmental performance, resource productivity and safety of existing industries, as well as by supporting the creation of new industries that provide environmental goods and services.

Over the past three decades, UNIDO has promoted the mainstreaming of resource efficiency and cleaner

production in industries and industrial parks located in developing and emerging economies, through pilot demonstrations, as well as global knowledge and dissemination projects. The first UNIDO pilot initiatives on EIPs were implemented in 2010 in India (Vadodara-Ankleshwar Industrial Area and Dahej Petroleum, Chemicals and Petrochemicals Investment Region, in the state of Gujarat). The same year, UNIDO introduced the concept of EIPs in Tunisia, targeting two industrial parks (Bizerte Business Park and Djebel Oust and Bir M'cherga Industrial Zone).

The Global RECP Programme

Since 2012, the work of UNIDO in the area of EIPs has expanded under the Joint Global Resource Efficient and Cleaner Production (RECP) Programme with the United Nations Environment Programme (UN Environment), funded by the Swiss State Secretariat for Economic Affairs (SECO).

The objective of the programme was to improve the resource productivity and the environmental performance of industrial businesses, and to contribute to sustainable industrial development and sustainable production and consumption in thirteen emerging and developing countries.

As part of UNIDO's EIP Pilot Projects, UNIDO promoted the mainstreaming of EIPs in developing and emerging economies through the implementation of country-level pilot projects in seven countries. Parks were selected based on their potential to foster economic and social growth, while safeguarding

the environment. Thus, the aim was to integrate business and environmental objectives to create economic opportunities, as well as to catalyze innovative avenues for business.

Holistic methodologies, ranging from approaching companies on an individual level over industrial synergy concepts and the inclusion of infrastructural, management and zoning considerations were applied as part of the EIP Pilot Projects. The objective of this approach is to upscale and expand resource efficient and cleaner production activities in order to move beyond the borders of EIPs and incorporate them into "sustainable cities". In such cities, economic and social symbiosis can be achieved in all aspects of sustainable urban planning. Waste streams can be exchanged on a regional scale, making use of a wider range of infrastructure, logistics and recycling and waste-to-energy options.

UNIDO also promotes the development of national programmes on EIPs that link existing local projects into a network of national stakeholders, helping countries to develop and plan EIPs in a strategic and coordinated manner. These projects will integrate the outcomes into national policies and create links with

companies and the financial sector, with a goal of financing, establishing or upgrading industrial parks to EIPs.

The figure below presents the core elements of the EIP Pilot Projects. These elements are discussed in the following section of this publication.

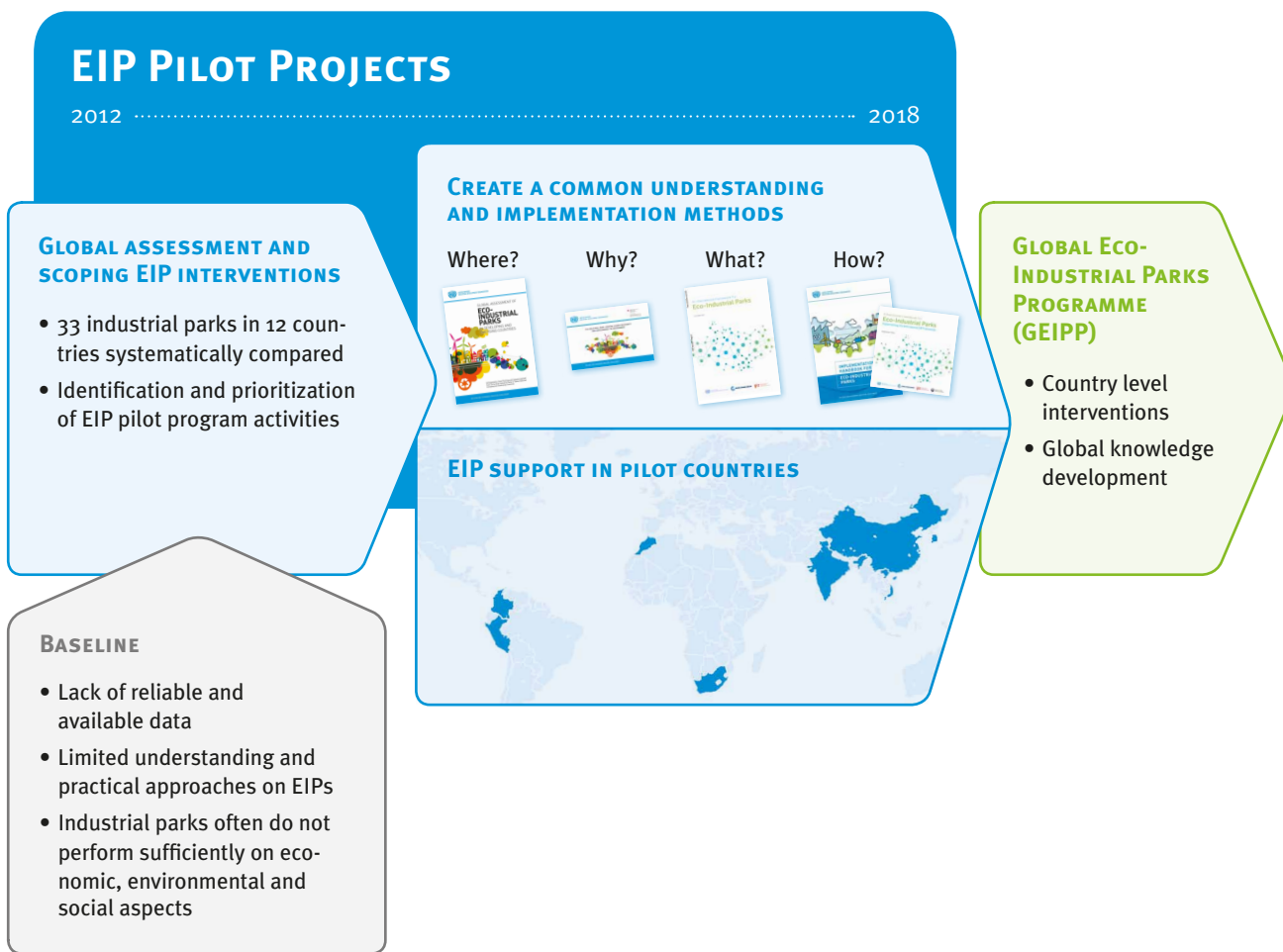


Figure 3: Overview of EIP Pilot Projects

EIP support in pilot countries

Since 2015, UNIDO has implemented EIP pilot projects in six countries under the Global RECP Programme (China, Colombia, India, Morocco, Peru and South Africa). One additional EIP country project is

implemented in Viet Nam, with the support of the Global Environment Facility (GEF) and SECO.

A mapping of these projects is shown in Figure 4.

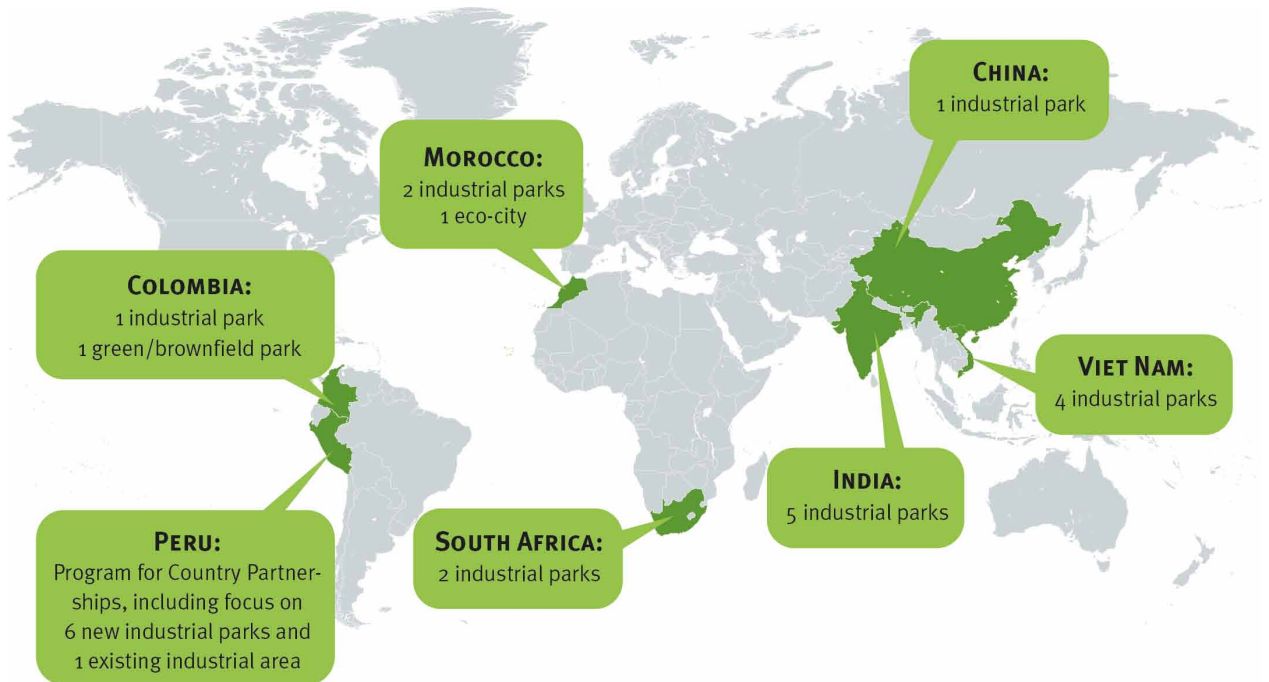


Figure 4: Pilot countries of the EIP Pilot Projects

TYPES OF SUPPORT

UNIDO provided the following top-down and bottom-up support to help pilot countries to achieve their EIP objectives:



SCOPING OF EIP INTERVENTION AREAS to identify and prioritize activities that would be most effective for stakeholder groups to work on, including the selection of industrial parks suitable for transformation into an EIP.



AWARENESS-RAISING ACTIVITIES amongst key stakeholder groups in the private and public sectors regarding the benefits and added value of EIPs and associated implementation processes.



SUPPORTING GOVERNMENTS to translate the EIP concept and associated practices into national policies and government decision-making processes. An enabling policy environment is important to ensure the successful development, implementation and mainstreaming of EIPs in the private and public sectors.



DEVELOPMENT OF AND ADVISING ON PARK MANAGEMENT MODELS required to develop and operate an industrial park sustainably, to attract investments and to provide attractive working conditions. Having a formalized and well-functioning park management structure is a key prerequisite for an EIP. Park management assists EIPs and their tenant companies to take advantage of opportunities associated with RECP, industrial synergies, integration with local community and natural environment, spatial planning/zoning, and park level infrastructure and utility services.



PROVIDING TECHNICAL SUPPORT to upscale resource efficiency and industrial synergies/symbiosis. RECP and industrial synergies increase efficiency and reduce risks to humans and the environment, both at the company and park levels. Industrial synergies can be shared infrastructure, service and utilities, or by-product and waste exchanges between companies. EIPs apply integrated and collective approaches to infrastructure and utilities to avoid isolated, inefficient and ineffective systems.



SUPPORTING PERFORMANCE MONITORING AND BENCHMARKING to track EIP progress against set objectives and thus demonstrate environmental, economic and social outcomes in an efficient, transparent and accountable manner.



DEVELOP CAPACITY-BUILDING OF STAKEHOLDERS in the private and public sectors throughout the entire development of EIPs (technical and non-technical capacities).



CONTRIBUTING TO SUSTAINABLE CITIES AND LOCAL COMMUNITIES to enhance the well-being of local populations and overall regional development. The operation of companies and the welfare of workers and local communities in a park's vicinity are reliant on functioning ecosystem services (e.g. water supply for production processes, and clean air for employees' health and productivity). Therefore, functioning ecosystems need to be preserved in parallel with activities that serve to mitigate business and social risks such as water and resource constraints and access to skilled workers. This was achieved through supporting functioning social management systems and putting outreach programmes in place.



STRENGTHENING SPATIAL PLANNING AND ZONING: A solid spatial planning and zoning process is a key component of an EIP. This includes considering economic, environmental, and social dimensions through multi-stakeholder processes with relevant stakeholders (e.g. government agencies, private sector and local communities). Master Planning applies to greenfield parks (e.g. site selection, design of industry precincts) and brownfield parks (e.g. retrofitting existing zones).

A SUMMARY OF THE EIP SUPPORT WORK IN THE PILOT COUNTRIES IS PROVIDED BELOW:

CHINA

UNIDO collaborated with the Jiangsu Scitury Allied Investment and Development Co., Ltd. (JSAID) to implement EIP strategies in the Zhenjiang Economic and Technological Development Zone (ZETDZ), located in the eastern part of Zhenjiang city. RECP assessments were undertaken in 10 industries from different industrial parks located in the area. UNIDO activities consisted mainly in the development of an industrial symbiosis platform, as well as training of the park's management.

COLOMBIA

UNIDO worked together with the Colombia National Cleaner Production Centre to implement EIP approaches in two industrial parks, near the cities of Medellín (Ciudadela Industrial Sabaneta) and Barranquilla (Parque Industrial Malambo (PIMSA)). These parks were selected for their potential to be success stories. UNIDO provided support in a number of areas, including: RECP assessments undertaken in individual companies; assessing the feasibility studies relating to industrial synergies between companies; and the identification and promotion of urban industrial synergies. For the PIMSA industrial park, an EIP concept plan was developed and an opportunity review was also undertaken and compared against the international EIP framework.

INDIA

UNIDO focused on five industrial parks in India. Two parks are located in the state of Telangana near the city of Hyderabad, one in Andhra Pradesh and two in the state of Gujarat. Different activities were conducted in the respective parks, including the implementation of RECP options within companies; the development of industrial synergies; and awareness-raising activities (on the social, economic and environmental benefits associated with EIPs). A comprehensive mapping exercise and a baseline survey of existing environmental infrastructure were also undertaken.

MOROCCO

The pilot work focused on the Zenata Eco-City, a rehabilitation project which encompasses an area of more than 1,800 ha. A development company (SAZ), has planned the construction of a completely new and innovative eco-city where two industrial parks will be located. The first park, the Zenata Industrial Park, is a brownfield park designed to host industries previously dispersed throughout the area. The second park, Zenata Cyclopolis, is a greenfield park reserved for future industrial activities.

Twelve RECP assessments were undertaken in the existing companies, with recommendations made to increase the efficiency of the processes after the resettlement in the new industrial park. In parallel, support was provided to establish a park management structure and to review the master plans of the industrial parks. UNIDO also provided strategic advice in relation to the design of the greenfield park.

UNIDO also worked on a greenfield industrial park in Morocco, the Berrechid Industrial Eco-Park, where support was provided to identify industrial synergies and to support the "Chambre Française de Commerce et d'Industrie du Maroc (CFCIM)" to undertake sustainability assessments.

PERU

The pilot work in Peru, which began in 2016 and ran until 2018, helped to identify the needs of the business sector through the creation of a local platform where industry representatives and government officials were able to meet and exchange best practice and identify solutions for common environmental challenges. RECP capacity and company level demonstration activities were also undertaken, as were activities aimed at EIP planning and construction.

Specific UNIDO support in Peru also includes the GEF-funded initiative for the promotion of a sustainable industrial area in Callao. This initiative aims to enhance regulatory mechanisms for sustainable industrial zone development and to increase the rates of adoption and diffusion of low-carbon and clean technologies and practices in order to reduce unintentional persistent organic pollutants (u-POPs), greenhouse gases (GHG), air pollutants and to improve chemical management in the industrial zone of Callao. Furthermore, a Sustainable Industrial Zones model will be created to enable the uptake and replication in other industrial zones of Peru. As part of the UNIDO Programme for Country Partnership (PCP), UNIDO also provides technical assistance and policy advice to support the development of a national strategy for establishing sustainable industrial parks. An element of this work is to develop a common vision and interaction among key stakeholders. The proposal for the national strategy is based on the analysis of the most relevant manufacturing sectors and a comprehensive assessment of the current national conditions for industrial park development. The strategy framework was submitted to a public and private consultation process. It is envisaged that the national strategy will be launched in 2019.

SOUTH AFRICA

Two industrial parks with different management models were selected in South Africa: namely, Epping Industria, an industrial area close to the city of Cape Town, and East London Industrial Development Zone (ELIDZ), Eastern Cape Province. In addition to undertaking RECP assessments and capacity-building activities for park management, significant efforts were made to identify and evaluate opportunities for industrial synergies. Strategic support was provided to the ELIDZ and an opportunity review was also undertaken against the International EIP Framework, helping to highlight the contribution of smart solutions to the sustainable development of ELIDZ.

VIET NAM

The EIP initiative in Viet Nam was the first project co-funded by the GEF and SECO through the Global RECP Programme. The project focuses on increasing the transfer, deployment and diffusion of clean technologies and practices for the minimization of hazardous waste, GHG emissions, as well as water pollutants and the sound management of chemicals in industrial zones of Viet Nam.

UNIDO collaborated with the Ministry of Planning and Investment (MPI), with the objective of introducing and implementing EIP principles in existing industrial zones in Ninh Binh, Da Nang, and Can Tho.

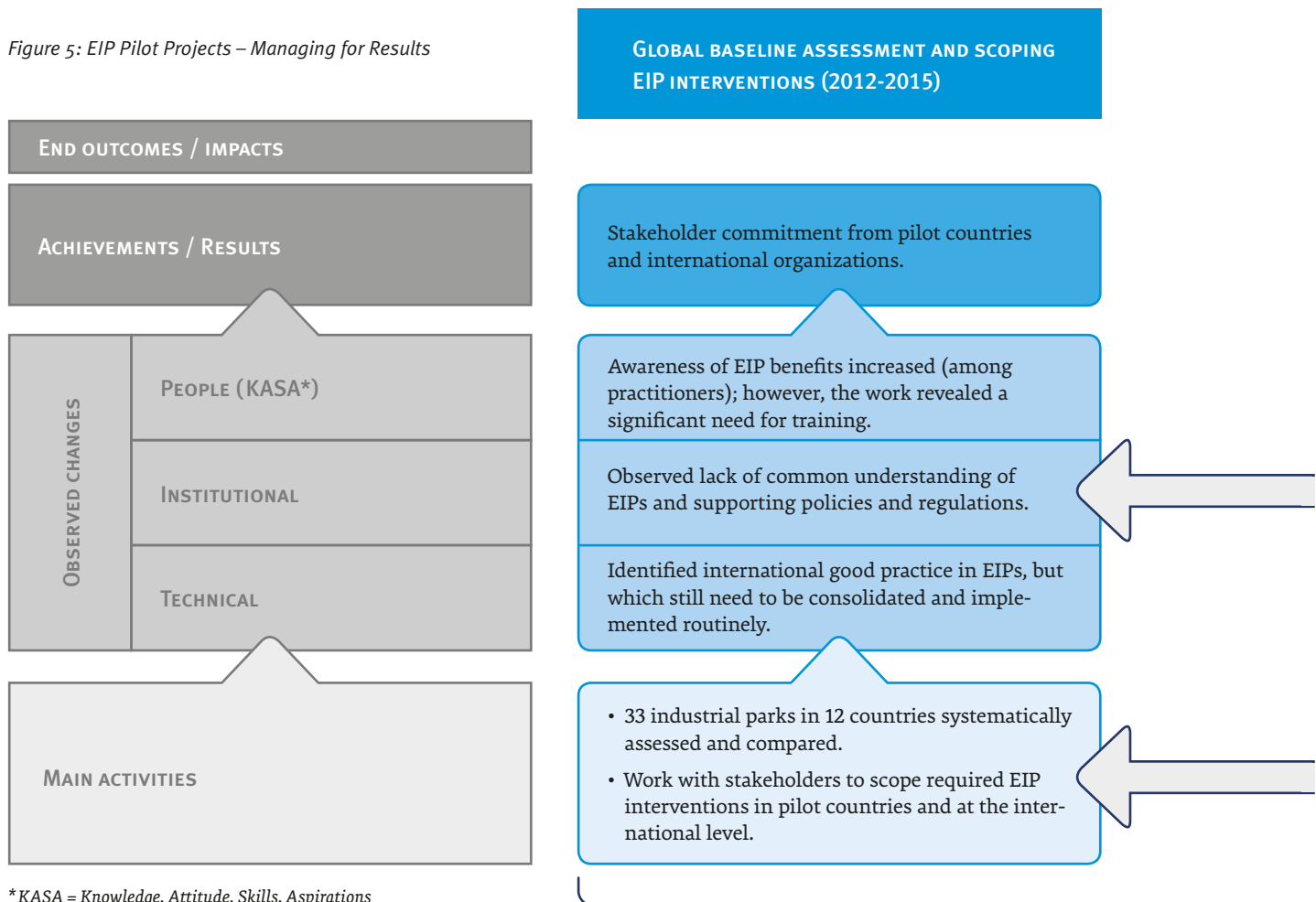
The work focuses on developing policies and guidelines to facilitate the transformation of industrial zones into EIPs; capacity-building on EIP strategies and measures; the identification of EIP pilot projects; and information dissemination. This work led to the approval of a national decree regulating EIPs in the country, amongst other successes of the EIP activities in Viet Nam.

3 MANAGING FOR RESULTS: FROM ACTIVITIES TO IMPACTS

UNIDO utilizes the Results Based Management (RBM) best practice approach to illuminate the desired impact of a project. The method embeds a Theory of Change⁷ that identifies causal linkages in a hierarchy of results (inputs, activities, outputs, outcomes, impact) in a multiple set of actors. This approach assists in the performance measurement for transparency, accountability, consensus building, learning and generating a common perspective on results.⁸

Drawing on the RBM approach, Figure 5 presents a summary of the development and achievements of the EIP Pilot Projects, including causal linkages from activities to outcomes/impacts. The RBM approach incorporates several dimensions, including time, assumptions and preconditions into a results chain logic based on systems thinking and an actor-based, behavioural change analysis.

Figure 5: EIP Pilot Projects – Managing for Results

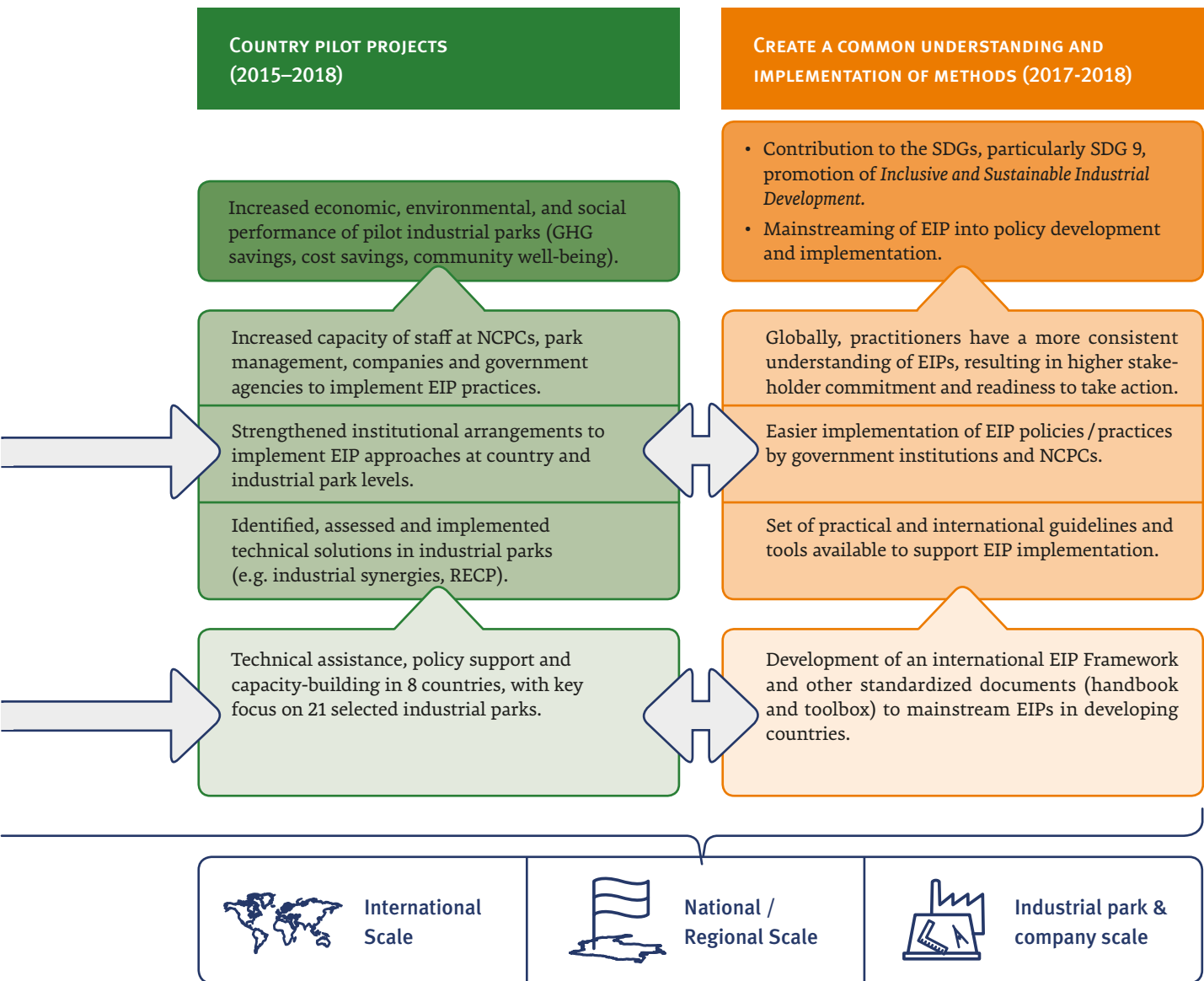


7 A “Theory of Change” methodology helps to organize ideas as to what change is desirable and also possible. The theory of change illustrates how interventions intend to achieve the desired results by reviewing underlying challenges and causal pathways (e.g. processes through which an outcome is brought into practice)

8 United Nations (2017). Results-Based Management in the United Nations Development System Analysis of Progress and Policy Effectiveness, Joint Inspection Unit. Geneva.

The innovative results planning approach, as used by UNIDO, helps to reveal a range of assumptions and factors (i.e. activities and changes in stakeholders' knowledge, attitude, skills and aspirations) that are necessary for the intended end results/outcomes/impacts to be achieved. For instance, an initial assessment of 33 industrial parks (bottom left of Figure 5) utilizing the RBM approach, helped to reveal gaps in understanding and differences in opinions associated with EIPs. In order to address these gaps, training and

awareness-raising materials were developed, which were also relied upon to convince key governmental stakeholders of the benefits of EIPs and to assist them with the mainstreaming of EIP into policy and national plans in targeted countries. In addition to the direct mitigation of environmental impacts and an increase in the social and economic performance of pilot industrial parks, such behavioural changes also help to contribute to different Sustainable Development Goals, in particular SDG 9 (top right of Figure 5).



A quantification of the outcomes and impacts achieved through the EIP Pilot Projects is provided in Figure 6.

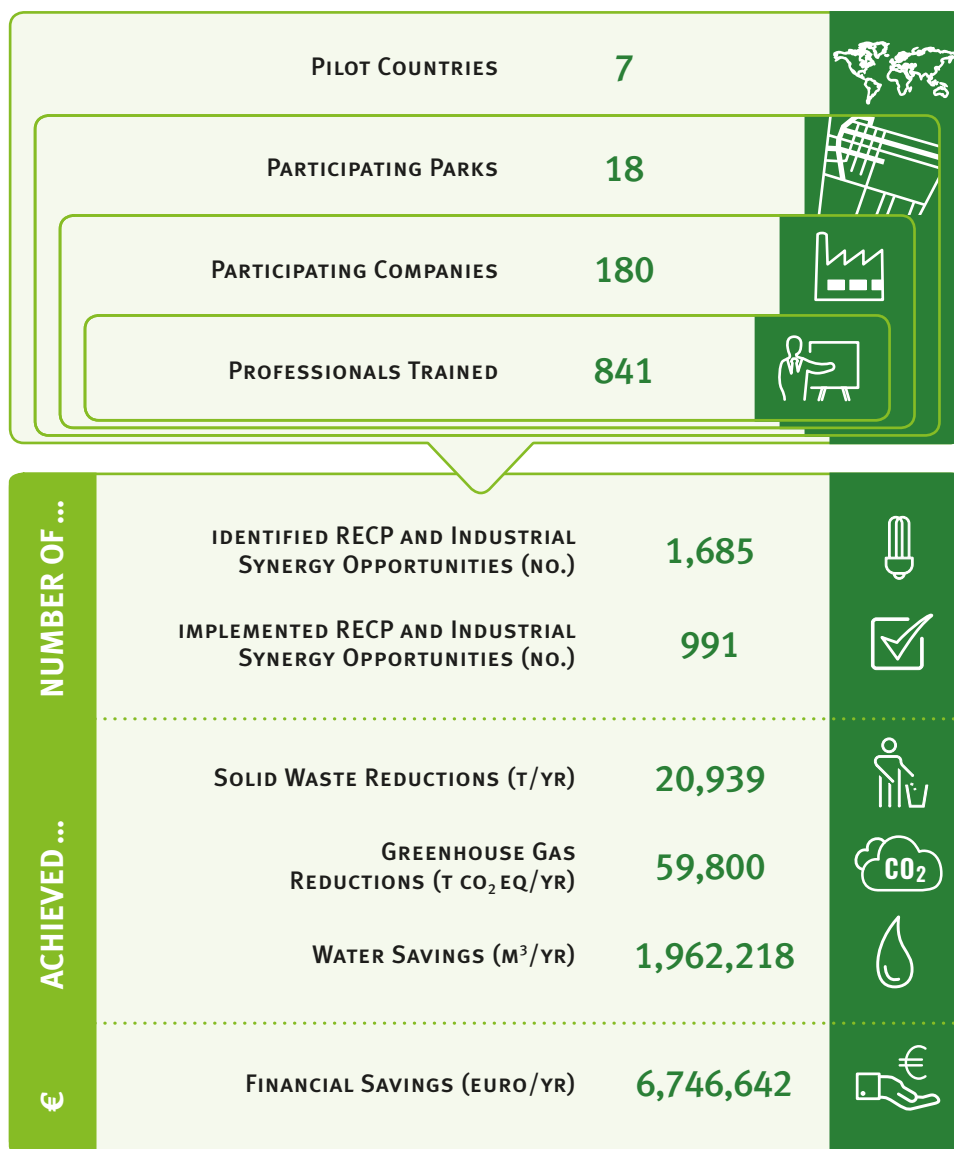


Figure 6: Summary of outcomes and impacts from EIP Pilot Projects

4 CREATING A COMMON UNDERSTANDING AND IMPLEMENTATION METHODS

Overview

One key focus area of the EIP Pilot Projects at the international level was to support the creation of a common understanding and awareness relating to EIPs and to provide practical guidance to practitioners on how to implement the EIP concept. The process

that was followed is presented in the figure below. Each of the “Why, Where, What and How” questions and supporting publications are presented in the following sections.

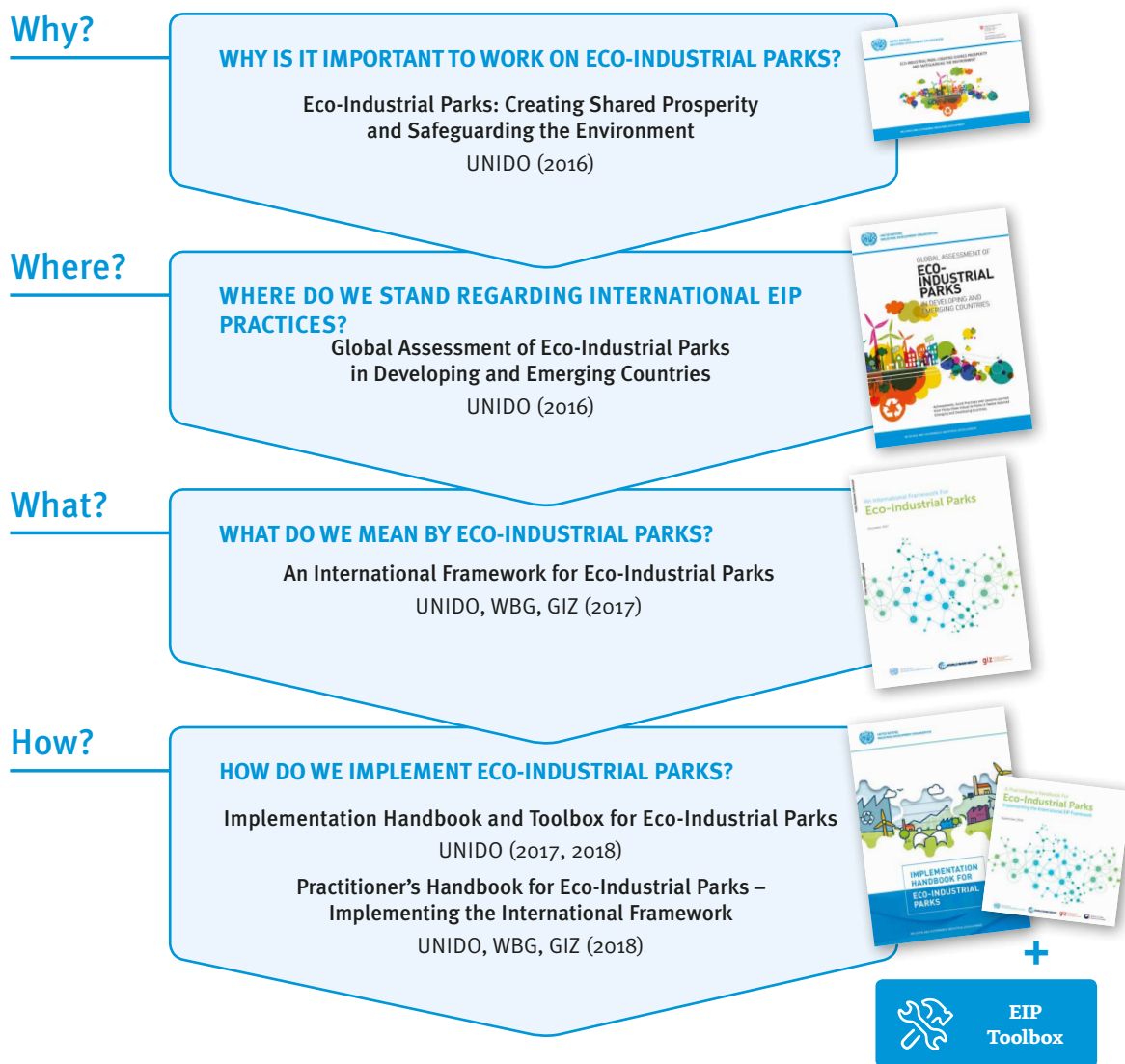


Figure 7: Creating a common understanding and implementation methods for EIPs

Why is it important to work on eco-industrial parks?

UNIDO (2016). EIPS: CREATING SHARED PROSPERITY AND SAFEGUARDING THE ENVIRONMENT

https://issuu.com/recpnet/docs/eco-industrial_parks_global



OBJECTIVES OF THE PUBLICATION

To provide an overview of UNIDO's EIP approach and the rationale for private and public stakeholders to work towards EIPs.

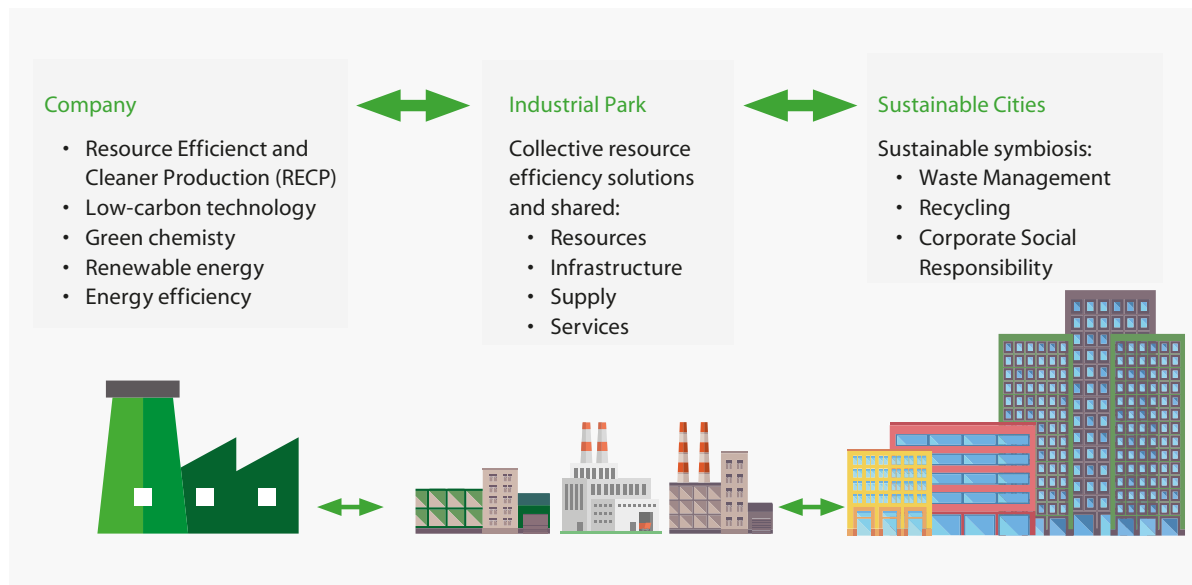
MAIN TOPICS ADDRESSED

- UNIDO's approach to EIPs
- Snapshot of country projects
- Partnership of upscaling

MAIN MESSAGE(S)

- EIPs have significant potential for catalyzing inclusive and sustainable industrial development.
- EIPs promote circular economy practices such as water resource conservation, recycling, the sound management of waste, as well as the creation of industrial synergies.

Industrial-urban symbiosis fosters inclusive and sustainable development through outward integration:



Where do we stand regarding international EIP practice?

UNIDO (2016). GLOBAL ASSESSMENT OF ECO-INDUSTRIAL PARKS IN DEVELOPING AND EMERGING COUNTRIES

<https://bit.ly/2RIag3z>

OBJECTIVES OF THE PUBLICATION

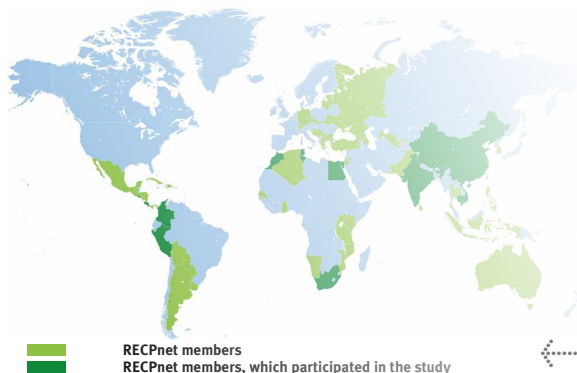
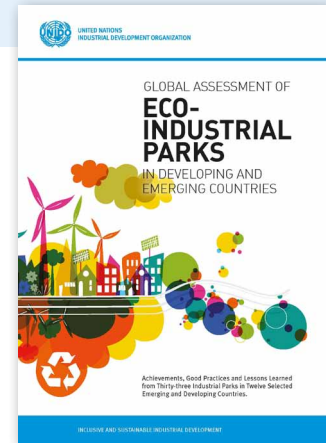
- To document 33 examples of industrial parks in 12 developing and emerging economies, including their policy contexts.
- To provide an in-depth comparative analysis of the results of the country case studies in order to provide an overview of their environmental, social and economic benefits.

MAIN TOPICS ADDRESSED

- Characteristics of the case studies
- Importance of eco-industrial development
- Park governance and management
- Drivers and barriers

MAIN MESSAGE(S)

- EIPs mean different things to different parties.
- Practice does not yet match ambition.
- Process and continuous improvement-based approaches appear most useful.
- A lack of experience, awareness, supporting regulations and their enforcement slow down the development and implementation of EIPs.
- Many good practice elements exist, yet still need to be collated, disseminated and routinely implemented.



PROF. SUREN ERKMAN
Head, Industrial Ecology Group
University of Lausanne

“In addition to environmental advantages, the global assessment highlighted that EIPs can bring significant economic and social benefits in developing and emerging countries, especially through the creation of jobs and increased economic competitiveness, including better access to financing and Foreign Direct Investment.”

Global assessment built upon experiences of RECPnet members

What do we mean by eco-industrial parks?

UNIDO, WBG, GIZ (2017). AN INTERNATIONAL FRAMEWORK FOR ECO-INDUSTRIAL PARKS

<https://bit.ly/2AD7Okr>

OBJECTIVES OF THE PUBLICATION

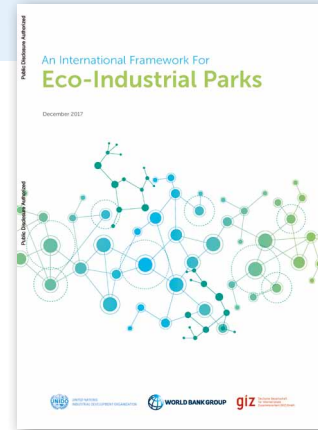
To provide an international framework with guidance on how an industrial park can work towards becoming an EIP.

MAIN TOPICS ADDRESSED

- A common understanding of EIPs
- Approach for defining performance requirements for EIPs
- Requirements for EIPs
- Future prospects

MAIN MESSAGE(S)

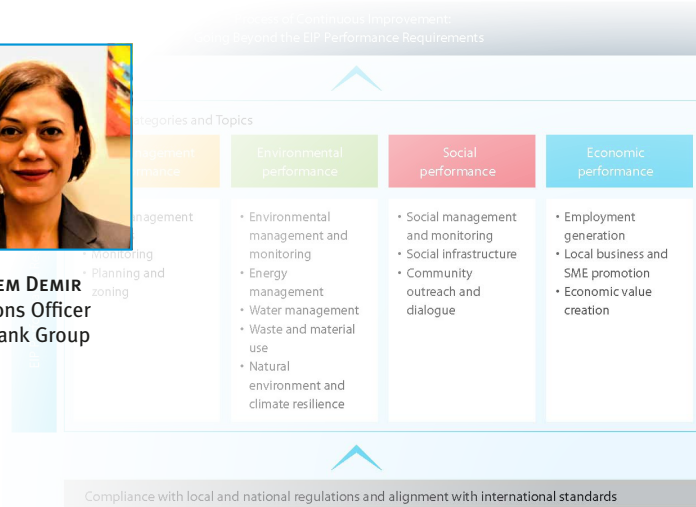
- This publication will help both governments and the private sector to work together to establish economically, socially and environmentally sustainable EIPs.
- By coming together, UNIDO, WBG and GIZ aim to provide a common vision for EIPs, which countries can use and modify to suit their respective needs.



“Eco-industrial parks are an emerging contributor to an environmentally and socially sustainable, and economically sound industrial development. At the World Bank Group, we work with national governments to tailor the EIP approach to the local context to ensure that it is in line with the demand for sustainability and market opportunities. We contribute to WBG’s commitment to climate change by promoting climate action in industrial zones and associated critical infrastructure.”



Ms. SINEM DEMIR
Operations Officer
World Bank Group



Overall framework for describing EIPs →

How can we implement eco-industrial parks?

UNIDO (2017). IMPLEMENTATION HANDBOOK FOR ECO-INDUSTRIAL PARKS

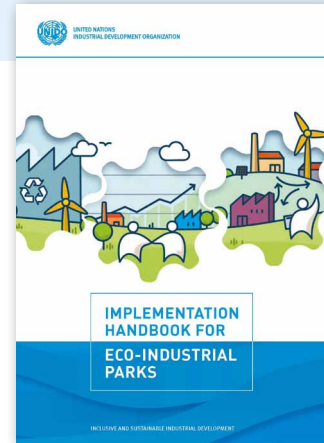
<https://bit.ly/2PNk2fb>

OBJECTIVES OF THE PUBLICATION

To assist private and public sector stakeholders with the integration of EIP concepts into existing industrial parks (brownfields) and new industrial parks (greenfields).

MAIN TOPICS ADDRESSED

- Scoping EIP interventions
- EIP awareness-raising
- EIP policy support
- Park management models
- Upscaling RECP and industrial synergies
- Performance monitoring and benchmarking
- Capacity-building
- The contribution of EIPs to sustainable cities
- Implementation tools



MAIN MESSAGE(S)

This handbook brings together the technical experience of UNIDO in developing and implementing EIP projects to provide current guidance on this area.

a) Scoping EIP Interventions	 Success factors for implementation	 Implementation steps	 Suggested tools	 examples
b) Awareness raising				
c) Policy support				
d) Park management structure				
e) Upscaling resource efficiency and industrial synergies				
f) Performance monitoring and benchmarking				

MR. NDIVHUHO RAPHULU
Director
National Cleaner Production Centre South Africa

“The development of eco-industrial parks, is a strategic focus area of our centre. UNIDO’s Implementation Handbook for EIPs is guiding our service offering to our clients and stakeholders on this important topic. The pilot has led to the centre integrating the EIP concept into its key offerings on resource efficiency.”

Scoping & concept

(Pre-) feasibility

Design & construction

Operation

Redesign & optimization

UNIDO’s implementation approaches for EIPs

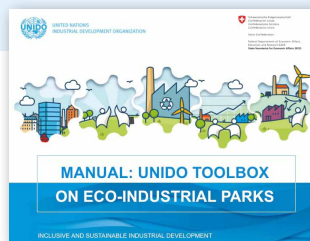
g) Capacity building

UNIDO (2018). TOOLBOX FOR ECO-INDUSTRIAL PARKS

Available upon request: EIP@unido.org

OBJECTIVES OF THE PUBLICATION

- To provide a set of practical, customized and flexible tools to assist practitioners (e.g. NCPs, industrial park management, policymakers) with the development and implementation of EIPs and related initiatives.
- To support EIP implementation and decision-making processes in relation to existing and new industrial parks.



MAIN TOPICS ADDRESSED

- EIP Selection Tool
- EIP Scoping Tool
- Awareness-Raising Assessment Tool
- Stakeholder Mapping Tool
- Policy Support Tool
- Park Management & Monitoring Tool
- Industrial Synergies Tool
- Monitoring & Reporting Tool for EIP Improvement Options
- Reporting Tool for RECP Assessments

MAIN MESSAGE(S)

The toolbox provides target users, such as the National Cleaner Production Centres and supporting service providers working on EIP projects, with the means to effectively develop EIPs in their respective countries.

“I have used the toolbox developed by UNIDO for several months in different industrial park projects in Morocco. It is very useful to have access to these standardized tools, which have benefited from international experience.”



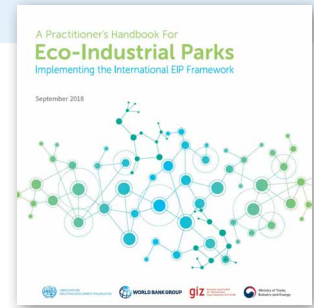
MR. DRISS ZAKARYA
Chief Executive Officer
EDIC Consulting

Development and lifecycle stages of industrial parks



Application and scope
of the EIP Tools

<https://bit.ly/2LWts7M>



OBJECTIVES OF THE PUBLICATION

To provide a practical, step-by-step guide that takes stakeholders through the entire process of operationalizing the International EIP Framework.

MAIN TOPICS ADDRESSED

- How to develop a national approach to EIPs
- Implementing the EIP Framework in industrial parks
- EIPs and industrial symbiosis

MAIN MESSAGE(S)

The Handbook is intended to aid practitioners with the operationalization of the International EIP Framework at the national and/or park level, as well as specific EIP performance requirements set in the Framework.

Steps	Activities	Responsible entities
1. Engage stakeholders and secure commitment	<ul style="list-style-type: none"> Map and categorize stakeholders. Align EIP goals with national policy goals and secure commitment. Develop capacity-building and awareness-raising activities. Engage stakeholders throughout the EIP policy development process. 	<ul style="list-style-type: none"> National and regional government regulators in partnership with regional and local authorities, research institutions, academia, and coordinating agencies.
2. Diagnostics	<ul style="list-style-type: none"> Select sample industrial parks to conduct technical analysis. Conduct technical analysis. Conduct policy and regulatory analysis. Conduct institutional analysis. Analyze financial needs. 	<ul style="list-style-type: none"> National and regional government regulators in partnership with Ministries, park operators, resident firms, banks, and so on. Park management unit in association with park operators and resident firms. Ministries, park operators, firms and banks.
3. Develop a national EIP roadmap	<ul style="list-style-type: none"> Conduct policy and regulatory reform. Establish governance structure and coordinating agencies. Determine financing mechanisms. 	<ul style="list-style-type: none"> National government regulators, in partnership with relevant stakeholders.
4. Launch, monitor and evaluate	<ul style="list-style-type: none"> Monitor, evaluate and verify. Scale up and mainstream the EIP. 	<ul style="list-style-type: none"> National government regulators, in partnership with coordinating agencies, and regional / local entities.



Ms. MAREIKE BOLL
 Advisor Climate Change and Environmental Policy
 Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, German Development Cooperation

“For a number of years, the GIZ has been promoting Sustainable Industrial Areas (SIA) as one approach to mainstreaming EIPs. It was a pleasure to collaborate with UNIDO, WBG and MOTIE on the Practitioner’s Handbook, and to be able to contribute with our EIP experiences. We regard this publication as a successful collaboration where international organizations have joined forces to drive forward the implementation of EIPs.”

Process for Developing National EIP Frameworks

5 HIGHLIGHTS FROM PILOT COUNTRIES

SCOPING EIP INTERVENTIONS



COUNTRY HIGHLIGHT
MOROCCO

SELECTION OF INDUSTRIAL PARKS AND SCOPING EIP INTERVENTIONS
BY NATIONAL AND INTERNATIONAL EXPERTS

KEY INTERVENTIONS

- Pre-selection of five industrial parks through a desk-top review, using the criteria defined in the tool.
- Meetings with the park management of the five pre-selected industrial parks (near Casablanca, Rabat and Tangier).
- Evaluation, ranking and selection of industrial parks.

SUCCESS FACTORS

- A standardized tool developed by UNIDO supported the selection.
- The tool is built on lessons learnt by UNIDO in various contexts and countries.
- Criteria and benchmarks established in the International Framework for EIP (UNIDO, WBG and GIZ, 2017) were accounted for when selecting and scoping the industrial parks.

OUTCOMES & IMPACTS

- A global score was attributed for all industrial parks.
- Scoping of prioritized EIP intervention was undertaken for each industrial park. The results were communicated during meetings with park managers.
- A greenfield industrial park located in Berrechid (near Casablanca) was selected.

STAKEHOLDER ENGAGEMENT

- Park managers were first contacted by the national team and then met during an international UNIDO mission.
- The greenfield industrial park that was selected has been especially designed as an EIP. This helped when seeking to obtain the commitment of the park manager and tenant companies in the project.
- A press release was prepared to announce the starting of activities in the selected industrial park.

“The park selection tool developed by UNIDO was very useful in helping to select suitable industrial parks for transformation into EIPs. I am delighted that the Berrechid Industrial Park was selected to be part of the EIP Pilot Project.”



MR. MOUNIR BENYAHYA
Industrial Parks Manager
Chambre Française de Commerce
et d’Industrie du Maroc (CFCIM)

Visit to wastewater treatment plant
under construction →





KEY INTERVENTIONS

- UNIDO involved 72 companies across 4 industrial parks in Ninh Binh, Da Nang and Can Tho and worked together with 56 companies to identify opportunities to adopt resource efficient and cleaner production (RECP) technologies and practices. This included options for optimizing inputs of raw material, energy, water, as well as chemical safety and waste management.
- A further 60 companies were assessed for synergistic (or symbiosis) options, so that a waste or by-product of one company could become an input for another. This included an assessment of potential symbiosis opportunities between the EIP and nearby communities.

SUCCESS FACTORS

- Technical assistance was provided to companies by UNIDO, which demonstrated that interventions could also be low-no cost and relatively easy to implement with high returns on companies' investments.
- These interventions also served to highlight that there was still considerable scope left for further reductions in resource consumption and correspondingly, opportunities to further reduce operational costs.
- UNIDO delivered training at all levels, including at the company level. Companies were also supported to develop their business cases in line with the EIP concept.

OUTCOMES & IMPACTS

- 939 RECP solutions were identified and implemented, raising USD 912,000 in private investment.
- The annual savings for companies exceed USD 6.5 million/year in the 4 industrial parks involved.
- This led (to date) to 17843 MWh/year saved, 429,609 m³/year reduction in water use, as well as 24,883 t of CO₂ eq/year avoided.
- Other opportunities are still being identified but it is expected that they will lead to even more significant resource savings.

STAKEHOLDER ENGAGEMENT

- UNIDO worked closely with the Viet Nam Centre for Cleaner Production (VNCPC), a well-known and recognized centre in the country with strong connections to the private sector.
- The Ministry of Planning and Investments facilitated the selection and communication with park managers and individual companies.

“Thirty enterprises have benefited from UNIDO’s support in the industrial zones of Tra Noc 1 & 2 in Can Tho. The enterprises have been guided to apply cleaner production, safer and sustainable manufacturing in their production processes, resulting in VND 46.56 billion (approx. USD 2 million) worth of savings per year through the adoption of low-cost and simple RECP solutions. Besides the companies that were supported directly, more than seventy other enterprises have benefited from capacity-building activities, such as training courses on the management of chemicals; on RECP identification; implementation; and loan support, etc.”



Ms. NGUYEN THI KIEU DUYEN
Deputy Head
Can Tho Industrial Zone Authority

Quang Minh Seafood limited company in Tra Noc 1&2 Industrial Zone, Can Tho City



AWARENESS-RAISING



COUNTRY HIGHLIGHT
SOUTH AFRICA

AWARENESS-RAISING & TRAINING SESSION ON EIPs GIVEN TO THE DEPARTMENT OF TRADE AND INDUSTRY & THE NATIONAL CLEANER PRODUCTION CENTRE OF SOUTH AFRICA

KEY INTERVENTIONS

- A presentation on the management of EIPs was conducted at the NCPC-SA in Pretoria in April 2018.
- The training aimed to (1) introduce the EIP concept; (2) create a common understanding of EIPs; (3) provide examples of international best practice; (4) gain an understanding of what key resources are available to support the development and implementation of EIPs; and (5) discuss the South African context.

SUCCESS FACTORS

Provision of training:

- A half-day training session gave participants insight into the EIP concept, providing them with an overview of the available tools/resource materials to be able to apply EIP concepts in their daily work.
- Training was held at the NCPC-SA training centre, which enabled large groups of NCPC-SA staff members to build on their knowledge of EIPs, a strategic focus of the NCPC-SA.

OUTCOMES & IMPACTS

- 22 professionals participated in the half-day introductory training, including industrial park management authorities and national ministries.
- Topics covered by the training addressed the following: (1) management of EIPs; (2) identification and development of industrial synergies; (3) the concept design process of new EIPs; and (4) policy support for EIPs.
- The presentation on EIPs helped the relevant stakeholders to understand how the EIP concept could help them promote economic growth, create a more sustainable operating environment for companies to compete, create jobs through efficient use of resources and greater productivity while protecting the environment and enabling investors to achieve their corporate social responsibility goals.

STAKEHOLDER ENGAGEMENT

Participants included representatives from:

- National Cleaner Production Centre of South Africa (NCPC-SA)
- Department of Trade and Industry;
- Gauteng Innovation Hub;
- GreenCape (non-profit organization); and
- The Council for Scientific and Industrial Research (CSIR)

“The training brought valuable international experience and learning to South Africa, including a set of practical EIP tools and approaches. The EIP concept continues to increase its international momentum. It is of key importance that NCPC, the Department of Trade and Industry and their partners work together to develop and implement EIPs in South Africa.”



MR. HENRY NUWARINDA
Project Manager
National Cleaner Production Centre
of South Africa

Delivery of training
at NCPC-SA offices



POLICY SUPPORT



COUNTRY HIGHLIGHT PERU

EVALUATION OF MANUFACTURING SECTORS FOR SUSTAINABLE (ECO-) INDUSTRIAL PARK DEVELOPMENT AND DEVELOPMENT OF INDUSTRIAL PARK STRATEGY OUTLINES

KEY INTERVENTIONS

An evaluation of the most relevant manufacturing sectors at national and regional levels in Peru was undertaken based on

- 1) economic criteria (e.g. GDP contribution, economic trends, relevance to MSMEs, latent comparative advantage);
- 2) technical criteria (infrastructure deficiencies);
- 3) environmental criteria (pollution risk);
- 4) and social criteria (employment, average income, community complaints).

SUCCESS FACTORS

- Multi-sectorial engagement and consultation
- Strong cooperation and alignment of the interventions with the National Programme for Productive Diversification in the Ministry of Production, which is responsible for industrial park development in Peru.

OUTCOMES & IMPACTS

The study outcomes helped to shape the framework of the National Strategy for Industrial Parks, which is aligned with the principles of sustainability and foresees the following:

- a) The establishment of a national multi-sectorial committee for coordination, policy making and implementation of industrial parks under the lead of the Ministry of Production of Peru (PRODUCE).
- b) An update of the legal framework and industrial park procedures.
- c) Identification of strategic opportunities based on best principles for site selection.
- d) Development of government capacity for industrial park facilitation, from identification and inception through to the development and launch of an industrial park.

STAKEHOLDER ENGAGEMENT

Main partners:

- National Cleaner Production Centre (CER) – technical lead
- Ministry of Environment
- Ministry of Production
- Local Government of Callao
- National Industrial Association (SNI)
- Chamber of Commerce

Consultations with a large number of representatives from the private and public sector

Colouring of cells: High priority Medium priority Potential priority

Manufacturing sectors (ISIC classification, Rev.4)	Regional level			
	National PERU	Lima	Piura	Arequipa
10 - Manufacture of food products				
11 - Manufacture of beverages				
12 - Manufacture of tobacco products				
13 - Manufacture of textiles				
14 - Manufacture of wearing apparel				
15 - Manufacture of leather and related products				
16 - Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials				
17 - Manufacture of paper and paper products				
18 - Printing and reproduction of recorded media				
19 - Manufacture of coke and refined petroleum products				
20 - Manufacture of chemicals and chemical products				
21 - Manufacture of basic pharmaceutical products and pharmaceutical preparations				
22 - Manufacture of rubber and plastics products				
23 - Manufacture of other non-metallic mineral products				
24 - Manufacture of basic metals				
25 - Manufacture of fabricated metal products, except machinery and equipment				
26 - Manufacture of computer, electronic and optical products				
27 - Manufacture of electrical equipment				
28 - Manufacture of machinery and equipment n.e.c.				
29 - Manufacture of motor vehicles, trailers and semi-trailers				
30 - Manufacture of other transport equipment				
31 - Manufacture of furniture				
32 - Other manufacturing				
33 - Repair and installation of machinery and equipment				



MR. JAVIER DÁVILA QUEVEDO
Vice-Minister
Ministry of Production (PRODUCE)

“UNIDO, through the Programme for Country Partnership (PCP) Peru, provides a significant contribution to achieving the modernization and sustainability of industry in Peru, facilitating partnerships and multi-sectoral cooperation and adding value to our commitment to innovation and the protection of the environment. UNIDO’s technical assistance is helping to accelerate the development of industrial parks and is of great importance.”

Summary of sector prioritization at national and regional levels



KEY INTERVENTIONS

- As a regulator, the Ministry of Planning and Investment (MPI) is the ministry responsible for overseeing the development of EIPs in Viet Nam.
- UNIDO and the World Bank Group have been supporting the Ministry of Planning and Investment to develop a national EIP guideline (launched in July 2018) with the approved Decree No.82/2018/ND-CP.

SUCCESS FACTORS

- Continuous UNIDO support over 4 years communicated the importance and benefits of EIPs at all levels, successfully engaging the central government, as well as local authorities.
- A committed group of policymakers with clear guidance from the highest political level was essential to ensure the buy-in from different ministries and to gain clarity regarding the process to be followed to implement the decree and the circulars, thus setting the stage for future EIP development in the country.
- The International EIP Framework was a fundamental factor in facilitating the alignment of the main international organizations working on EIP development, as was the national framework on EIP in Viet Nam.

OUTCOMES & IMPACTS

- The national EIP guidelines provide a mechanism to operationalize the development of EIPs in Viet Nam and its institutional framework in more than 300 industrial zones across the country.
- The guidelines detail the process to be recognized as an EIP, as well as the roles and responsibilities of different stakeholders to enable the transformation of existing industrial parks into EIPs.

STAKEHOLDER ENGAGEMENT

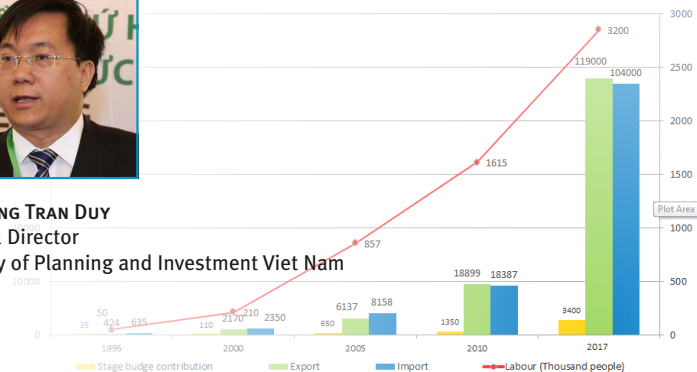
- MPI, UNIDO and the World Bank Group engaged multiple stakeholder groups to help the government develop and implement a national EIP guideline, in effect, similar to a national framework.
- Regulators and governmental institutions; industrial park managers; and participating enterprises were all integrated into the stakeholder engagement process

“The national process towards the definition of clear policy and regulations for eco-industrial parks has been set by Decree 82, which provides a good legal baseline for implementation. The implementation offers a lot of opportunities, but also faces constraints in Vietnamese legislation as concrete opportunities to develop industrial symbiosis are still limited by regulation. Scaling up EIPs will involve seeking inputs from different stakeholders, including from the private sector, and will require the coordinated efforts of different ministries.”



MR. DONG TRAN DUY
General Director
Ministry of Planning and Investment Viet Nam

IZs, EPZs Contribution to Country



Industrial parks in Viet Nam

PARK MANAGEMENT



COUNTRY HIGHLIGHT CHINA

TECHNICAL SUPPORT PROVIDED TO THE PARK MANAGEMENT OF THE SINO-SWISS ZHENJIANG ECOLOGICAL INDUSTRY PARK

KEY INTERVENTIONS

- Several training sessions and workshops were organized in the park for various stakeholders (e.g. presentation of the EIP concept, training for companies, academic conferences, etc.).
- A project brochure was created and disseminated to increase awareness regarding the benefits of EIPs.

SUCCESS FACTORS

- Close cooperation with Swiss organizations (e.g. Cleantech Switzerland (CTS)).
- The local authorities of Zhenjiang are promoting circular economy activities, for instance through the creation of a dedicated platform for waste and by-products management.
- The park management benefited from the technical support provided by the Chinese Research Academy of Environmental Science.

OUTCOMES & IMPACTS

- New contracts were secured with tenant companies.
- The services delivered by the park management were improved. The services that they provide now include the provision of advice on social, economic and environmental sustainability issues.

STAKEHOLDER ENGAGEMENT

- Large numbers of stakeholders are committed to the project (e.g. industry representatives, authorities).
- The park management of the Sino-Swiss Zhenjiang Ecological Industry Park (Jiangsu Scitury Allied Investment and Development Co., Ltd) started working synergistically with other industrial parks and stakeholders in the region (e.g. local authorities, single industries located close to the parks).



“It was a great honour to work with UNIDO. The overall management and operation of the Sino-Swiss Zhenjiang Ecological Industry Park greatly benefited from this collaboration.”

MR. WANG YANG
Executive Director and General Manager
Jiangsu Scitury Allied Investment and Development

 Technical support with park management



KEY INTERVENTIONS

- Capacity-building: Training and workshops were held for park management and tenant companies.
- Visits to ALEAP were made by international experts, who also made recommendations as to how ALEAP and its companies could make sustainability improvements.
- Assessment of the industrial park's social, environmental and economic performance.

SUCCESS FACTORS

- Within the context of the Indo-German Development Cooperation, GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH), has been providing significant technical support to ALEAP for a number of years.
- Capacity-building activities were designed for diverse industrial parks in Andhra Pradesh State (Jeedimetla Industrial area and ALEAP).
- The training and workshops were also an opportunity for networking for identifying synergies with other industrial parks and companies.

OUTCOMES & IMPACTS

- ALEAP's current performance was evaluated and EIP gaps identified.
- Recommendations and guidance were provided on how ALEAP could implement sustainability strategies and EIP approaches.
- Training of park management and tenant company staff.
- A Memorandum of Understanding was signed with ALEAP for the duration of the project.

STAKEHOLDER ENGAGEMENT

The ALEAP management team and representatives of tenant companies participated in workshop with other key stakeholders (e.g. representatives of local authorities, service providers and national experts).

"GIZ has been actively supporting ALEAP for several years. The participation of ALEAP staff in the training provided as part of the UNIDO's Indian EIP project, was very welcome."



MR. RAGHU BABU NUKALA
Project Director
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Visit to ALEAP: A Company producing sanitary napkins →



RESOURCE EFFICIENT AND CLEANER PRODUCTION



COUNTRY HIGHLIGHT CHINA

RECP PILOT PROJECT TO FOSTER ECO-INDUSTRIAL DEVELOPMENT IN ZHENJIANG ECONOMIC AND TECHNOLOGICAL DEVELOPMENT ZONE (ZETDZ)

KEY INTERVENTIONS

- 10 RECP assessments were undertaken with companies.
- Two training sessions on RECP were provided by national experts.
- Links were created between the EIP approach and the Zhenjiang Circular Economy Platform.

SUCCESS FACTORS

- Close collaboration between the park manager (Jiangsu Scitury Allied Investment and Development Co) and the Chinese Research Academy of Environmental Sciences, National Cleaner Production Centre.
- The RECP assessments were undertaken with large companies, making RECP opportunities relatively easy to identify and finance.

OUTCOMES & IMPACTS

- Environmental impacts of industries (e.g. GHG emissions, wastewater production) were significantly reduced.
- Significant economic benefits (savings of approximately 0.5 million euro per year).
- Reduced risks and nuisance (e.g. odours) for local communities.

STAKEHOLDER ENGAGEMENT

- RECP assessments were undertaken in close collaboration with the companies.
- Several events were organized in the park to increase awareness relating to the benefits of cleaner production and industrial synergies.
- Meetings were held with key representatives from local and regional authorities.



MR. JIE GAO
Project Manager
Strategic and Investment Promotion Dept.
Sino-Swiss Zhenjiang Ecological Industrial Park

"It was a great opportunity for us to work with UNIDO. The RECP approach was particularly useful in helping us to decrease atmospheric emissions and other environmental impacts originating from industry in Zhenjiang."

 RECP assessment in Zhenjiang

RESOURCE EFFICIENT AND CLEANER PRODUCTION



COUNTRY HIGHLIGHT INDIA

RESOURCE EFFICIENT & CLEANER PRODUCTION (RECP) PILOT PROJECT TO FOSTER EIP DEVELOPMENT IN INDIA (JEEDIMETLA INDUSTRIAL ESTATE IN ANDHRA PRADESH)

KEY INTERVENTIONS

- RECP assessments were completed in 20 companies by the Confederation of Indian Industry – Godrej Green Business Centre (CII–Godrej GBC).
- Organization of a three-day exposition on RECP and EIP approaches.
- Organization of 4 workshops on RECP implementation.

SUCCESS FACTORS

- The CII–Godrej GBC has a strong experience in RECP and industrial parks (approximately 300 industrial parks are located in the State of Andhra Pradesh).
- Around 200 industries have been approached to disseminate information on the RECP approach and its benefits.

OUTCOMES & IMPACTS

- Development of a “Pocket guidebook to improve Electrical Efficiency”.
- Significant environmental (e.g. water and material saving), and economic benefits.
- Increased capacity of industry staff to enable further energy efficiency, resource efficient and other RECP measures.
- Memorandum of Understanding (+ engagement plans) signed with industrial park managers.

STAKEHOLDER ENGAGEMENT

- Interaction with media on the EIP initiative (publication of an article in a leading daily newspaper).
- Stakeholder engagement was also undertaken as part of the international experts’ missions.

“The results of this pilot project were significant. Many companies in the industrial park are now applying RECP strategies in their operations (in particular energy efficiency approaches), and their benefits are well understood.”



MR. KIRAN ANANTH
Principal Counsellor
Confederation of Indian Industry
Sohrabji Godrej Green Business Centre

RECP assessment in
Jeedimetla Industria Estate →



INDUSTRIAL SYNERGIES

COUNTRY HIGHLIGHT COLOMBIA

INDUSTRIAL SYNERGY DEVELOPMENT IN CIUDADELA INDUSTRIAL SABANETA AND PARQUE INDUSTRIAL MALAMBO (PIMSA)

KEY INTERVENTIONS

- Workshops were held with companies and park management to identify and prioritize synergy opportunities.
- Follow-up activities were undertaken on promising synergy opportunities identified during the workshops.
- Technical and economic feasibility assessments were undertaken on selected synergy opportunities (e.g. reuse of treated wastewater, utilization of hazardous wastes by a cement plant).

SUCCESS FACTORS

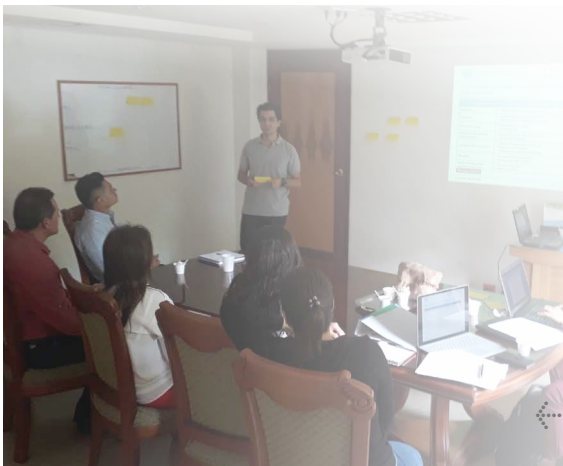
- Initial efforts prioritized identifying synergy opportunities with the highest potential benefits and likelihood of achievement, and which also had the support and commitment of companies.
- Close collaboration with companies linked to the prioritized synergy opportunities.

OUTCOMES & IMPACTS

- 20 synergy opportunities were identified and prioritized for the Ciudadela Industrial Sabaneta and PIMSA.
- Feasibility assessments showed that the reuse of treated wastewater from the producer of school supplies of a nearby textile company were technically and economically feasible. Synergy is being considered for implementation by the companies.
- A feasibility assessment was undertaken on the joint collection and utilization of hazardous waste generated by PIMSA companies (about 600 tonnes per year) by a cement plant located outside of the industrial park. Assessments showed that alternatives to hazardous waste disposal to landfill are available at a lower cost.

STAKEHOLDER ENGAGEMENT

The identification, prioritization and feasibility assessments were undertaken in close collaboration with companies.



Ms. VANESSA BOBADILLA
Environmental Manager
Doricolor

“The EIP pilot project has allowed companies from Ciudadela Industrial Sabaneta, such as Doricolor, to overcome barriers in the development of synergies between productive processes. This reinforces our commitment to supporting greater environmental awareness and practices.”

➤ Synergy identification workshop in Ciudadela Industrial Sabaneta

INDUSTRIAL SYNERGIES



COUNTRY HIGHLIGHT INDIA

TECHNICAL SUPPORT FROM THE GUJARAT CLEANER PRODUCTION CENTRE (IN DAHE) PETROLEUM, CHEMICALS & PETROCHEMICALS INVESTMENT REGION & IN THE NANDESARI INDUSTRIAL ESTATE)

KEY INTERVENTIONS

- Evaluation of common infrastructure (e.g. wastewater treatment plants).
- Data collection on inputs/outputs from companies in industrial parks through questionnaires and RECP assessments, and the establishment of a supporting database.
- Identification and support for the implementation of promising synergy opportunities.

SUCCESS FACTORS

- A strong enabling environment exists in the pilot parks for the development of industrial synergies (e.g. the parks are managed by industrial associations representing the companies in the parks with industry representatives often meeting to discuss operational matters).
- Multiple opportunities for synergies are possible as the industrial parks contain diverse industries (SMEs and large international companies), from different sectors (e.g. chemical, food, etc.).

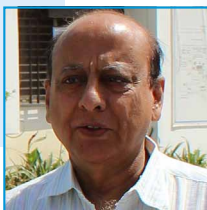
OUTCOMES & IMPACTS

- Different kinds of industrial synergies were (or will soon be) implemented: Utility synergies (e.g. solar street lights, common wastewater treatment plant), service synergies (e.g. mobile toilets, shared shuttle service), and by-product synergies (e.g. reuse of chemicals, organic waste as alternative fuel).
- Mitigation of the total amount of waste going to landfill, thanks to by-product synergies.

STAKEHOLDER ENGAGEMENT

- Customized awareness-raising materials and approaches (e.g. presentations, seminars, workshops).
- Facilitation of networking and collaboration between companies through the organization of regular events (e.g. meetings, workshops).
- Close collaboration with local authorities (e.g. Gujarat Pollution Control Board, Energy Development Authority).

“Gujarat is one of the most industrialized states of India. The economic prosperity resulting from this industrialization is of course very welcome, but it also raises environmental and social concerns. Gujarat is making sincere efforts towards the protection of the environment. It was a privilege for us to work with UNIDO, to fill the gap required for the overall benefit of the environment and society.”



MR. BHARAT JAIN
Member Secretary
Gujarat Cleaner Production Centre

Water purification by reverse osmosis
in Gujarat (pilot project) →



PERFORMANCE MONITORING AND BENCHMARKING

COUNTRY HIGHLIGHT COLOMBIA

EIP OPPORTUNITY REVIEW AND RECOMMENDATIONS FOR PARQUE INDUSTRIAL MALAMBO (PIMSA), COLOMBIA

KEY INTERVENTIONS

- Assessment of PIMSA's performance against the International Framework for EIPs.
- Identification and prioritization of EIP opportunities for PIMSA.
- Detailed assessment and action planning for selected EIP opportunities for PIMSA.

SUCCESS FACTORS

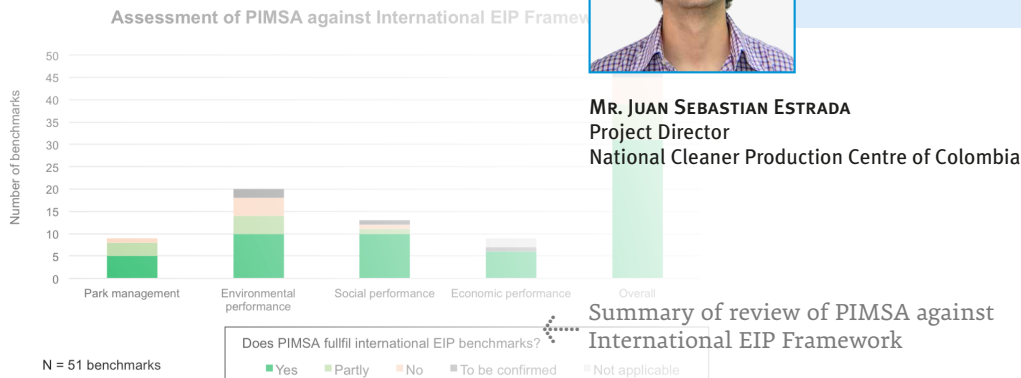
- Strong commitment from park management to develop PIMSA in an EIP.
- The International Framework for EIPs (UNIDO, WBG, GIZ, 2017) provided a robust foundation from which to assess PIMSA against international benchmarks.
- The assessment benefited greatly from UNIDO's EIP Assessment and Monitoring Tool, which was piloted in PIMSA.

OUTCOMES & IMPACTS

- PIMSA performs and compares favorably against large proportions of the benchmarks in the International EIP Framework (e.g. 80% of the applicable international benchmarks are fully or partly met by PIMSA).
- A set of concrete and practical opportunities were identified and prioritized for PIMSA to meet all EIP requirements of the International Framework, including an action plan to support their implementation with key stakeholders.

STAKEHOLDER ENGAGEMENT

- The assignment was undertaken in collaboration and under the guidance of the management team of Parque Industrial Malambo (PIMSA).
- It will also serve as a basis for park management to support engagement with its external stakeholders on its strategic position, current performance and future plans of PIMSA to transform into an EIP.



"The performance assessment of PIMSA highlights the achievements that result from the long-term commitment of park management with an understanding of the economic, environmental and social objectives, and associated opportunities of an industrial park."

PERFORMANCE MONITORING AND BENCHMARKING



COUNTRY HIGHLIGHT SOUTH AFRICA

REVIEW AND ACHIEVEMENTS OF EAST LONDON INDUSTRIAL DEVELOPMENT ZONE (ELIDZ) ON SMART SOLUTIONS AND EIPs

KEY INTERVENTIONS

- Highlighted the contribution of smart solutions to sustainable development of the ELIDZ, including smart solutions implemented to date and future solutions.
- Reported on the assessment of the ELIDZ against the International Framework for EIPs (UNIDO, WBG, GIZ, 2017), including the identification and prioritization of promising EIP opportunities.
- Review of the contribution of smart solutions to meet international EIP benchmarks, as well as the identification of new smart solutions that could assist with the sustainable development of the ELIDZ.

SUCCESS FACTORS

- The concepts of smart parks and EIPs have many common approaches. For instance, smart manufacturing is also promoted as supply synergies in EIPs. Smart solutions can assist industrial parks to achieve environmental, economic, and social sustainability.
- The development and implementation of smart solutions is a key strategic priority for ELIDZ. Therefore, it was critical to deliver an integrated assessment linking smart solutions and the EIP concepts.
- The International Framework for EIPs provided a robust foundation to assess ELIDZ against international benchmarks.

OUTCOMES & IMPACTS

- The ELIDZ performs and compares favorably against large proportions of the benchmarks in the International EIP Framework. In summary, about 84% of the applicable international benchmarks are fully or partly met by the ELIDZ.
- A set of 18 concrete EIP opportunities to transform the ELIDZ towards an EIP were identified and prioritized based on their benefits and achievability. These further strengthen the strategic positioning, resource efficiency and risk profile of the ELIDZ.

STAKEHOLDER ENGAGEMENT

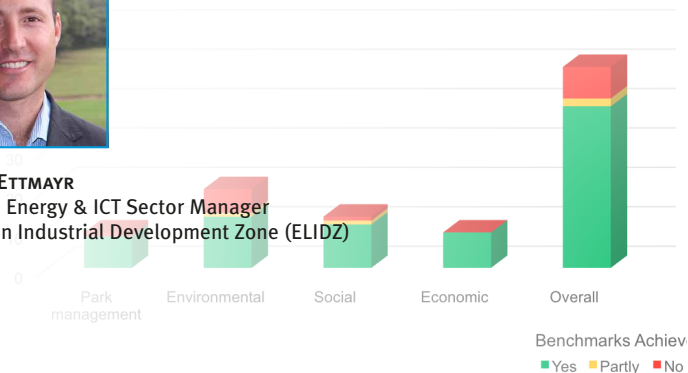
The assignment was initiated based on the specific interest of the East London Industrial Development Zone and undertaken in close collaboration and with inputs from ELIDZ.

“The work undertaken on eco-industrial parks will assist us not only in meeting our commitment to lowering our impact on the environment, but also in strengthening our competitiveness through resource efficiencies and social interactions. The smart park principles will help with monitoring and evaluation through an ICT platform, further enhancing our sustainability. This should bring us to the forefront of changes expected with the 4th Industrial Revolution.”



MR. CHRIS ETTMAYER
Renewable Energy & ICT Sector Manager
East London Industrial Development Zone (ELIDZ)

Review of the ELIDZ against the International EIP Framework





KEY INTERVENTIONS

A presentation on the key benefits of EIPs and a training session were held on the development and implementation of EIPs in Viet Nam. The objectives of the training were to:

- 1) create a common understanding of EIPs;
- 2) share international good practice examples and their application in the Vietnamese context;
- 3) learn about EIP resources and tools available; and
- 4) understand and learn about the opportunities as well as associated challenges in applying and replicating the EIP concept in Viet Nam.

SUCCESS FACTORS

To create impact, committed senior representatives from the private and public sectors were selected to participate and apply the insights gained from the training. Training sessions were customized to the needs of participants and the Vietnamese context, including a balanced mix of theory, practical examples and interactive exercises.

OUTCOMES & IMPACTS

- 38 people participated in the event, including industrial park management authorities and national ministries.
- Topics covered by the training covered (1) management of industrial parks; (2) prioritizing and selecting industrial parks for EIP interventions; (3) performance monitoring and benchmarking; (4) policy support; (5) industrial synergies; and (6) concept designs of EIPs.

STAKEHOLDER ENGAGEMENT

Participants included representatives from:

- Industrial park management authorities (e.g. Da Nang, Can Tho, Ninh Binh)
- Ministry of Planning and Investment
- Ministry of Finance
- Ministry of Natural Resources and Environment
- Ministry of Industry and Trade
- Ministry of Science and Technology)



“EIP is a new concept in Viet Nam, therefore, it is very important to strengthen the capacity of government officials at both the central and provincial levels on EIP management. Vietnamese officials that participated in the high-level training provided by UNIDO experts, are now on the same page of understanding about EIP-related topics and issues. We expect to regularly benefit from the capacity-building activities of the project.”



MR. VU QUOC HUY
Deputy Director,
Department of Economic Zones Management
Ministry of Planning and Investment Viet Nam

 Training participants

CONTRIBUTION TO SUSTAINABLE CITIES



COUNTRY HIGHLIGHT
SOUTH AFRICA

DEVELOPMENT OF URBAN-INDUSTRIAL SYNERGIES BETWEEN BUFFALO CITY METROPOLITAN MUNICIPALITY & THE EAST LONDON INDUSTRIAL DEVELOPMENT ZONE

KEY INTERVENTIONS

- Waste management and value recovery from municipal solid waste, recyclables, organic waste and hazardous waste are key priorities of the Waste Management Department of the Buffalo City Metropolitan Municipality (BCMM).
- A number of initiatives, amongst others involving BCMM and East London Industrial Development Zone (ELIDZ), are in the pipeline to advance waste management in East London.
- The National Cleaner Production Centre of South Africa (NCPC-SA) assisted with coordinating these efforts and establishing partnerships to drive forward its implementation.

SUCCESS FACTORS

- Commitment from relevant stakeholders to address waste management challenges in East London.
- Focus on win-win solutions that deliver benefits to all stakeholders, including the community.
- A facilitative role was undertaken by an independent institution (NCPC-SA) to bring stakeholders together and to coordinate the next steps.

OUTCOMES & IMPACTS

- An opportunity exists for the development of an urban-synergy opportunity for a new company in ELIDZ (Clariter ZA) to recycle the waste plastics collected by the Buffalo City Metropolitan Municipality.
- This synergy could significantly reduce the amount of plastic waste going to landfill and could serve as a valuable resource material for a recycling process.
- The stakeholders involved are considering a one-year trial to test and further develop a system to process the city's plastic waste.

STAKEHOLDER ENGAGEMENT

Urban-industrial synergy opportunities highlight the importance of multi-stakeholder engagement and a need for an impartial facilitator (NCPC-SA in this case) to connect the different initiatives and key players.

“Urban-industrial synergies and multi-stakeholder collaborations can make a significant contribution to creating win-win solutions for both the public and the private sectors.”



MS. NOMPHELO DANIEL
General Manager of Solid Waste Management
Buffalo City Metropolitan Municipality

Clariter waste plastics processing facility in ELIDZ



CONTRIBUTION TO SUSTAINABLE CITIES



COUNTRY HIGHLIGHT MOROCCO

SUPPORT FOR THE ZENATA ECO-CITY PROJECT



KEY INTERVENTIONS

- Support was provided for the development of an EIP to host companies previously scattered in area.
- A development strategy and an operational roadmap were established for the development of a recycling hub in Zenata to collect and valorize waste/by-products from the eco-city's industries and residential areas, as well as from the Grand Casablanca region.



SUCCESS FACTORS

- Sound collaboration between local, national and international experts, in order to improve the efficiency of the intervention.
- The SAZ (société d'aménagement Zenata) developed an eco-city concept for Zenata and elaborated a sustainability referential, which was taken into account in all of the project activities.



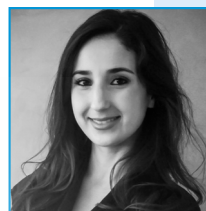
OUTCOMES & IMPACTS

- RECP assessments were undertaken in 12 industries.
- It is expected that the RECP opportunities identified will be implemented after the relocation to the new industrial park.
- Quantification of the waste produced in the Casa-blanca region is expected to be completed in 2019.
- The main stakeholders were identified and potential urban-industrial synergies in the region evaluated.



STAKEHOLDER ENGAGEMENT

- Stakeholder mapping was undertaken in order to understand the interests and influence of key stakeholders on EIPs. Potential conflicts between stakeholders were also identified and analyzed.
- Meetings and conferences were organized with key stakeholders (e.g. industry representatives and municipalities) to raise awareness of the potential benefits of EIPs.



Ms. SAFAA BOUTAMARHZOUTE
Project Manager
Société d'aménagement Zenata

"Industrial activities are an integral part of eco-cities, particularly as they provide decent and local jobs. Working with UNIDO allowed us to increase the complementarity between the Zenata Eco-City and EIPs as part of a Circular Economy approach."

← Zenata Eco-City (left) and industrial park (right)
More information: <https://www.zenataecocity.ma/>

SPATIAL PLANNING AND ZONING



COUNTRY HIGHLIGHT COLOMBIA

EIP CONCEPT PLANNING OF PARQUE INDUSTRIAL MALAMBO (PIMSA)

KEY INTERVENTIONS

- PIMSA has around 60% of land available, which can accommodate up to 80 new companies.
- An EIP concept plan was developed for PIMSA, with a key focus on attracting synergistic companies, industry clustering and development of sustainable infrastructure, services and utilities.

SUCCESS FACTORS

- A clear understanding from park management that current and future environmental and social risks are high business risks for PIMSA.
- A clear and practical step-by-step methodology was applied in a workshop setting with park management to develop the EIP concept for PIMSA in a transparent manner.

OUTCOMES & IMPACTS

- The strategic EIP concept assists park management to develop PIMSA and its infrastructure, utilities and available industrial land by means of the EIP concept and industrial synergies.
- The focus of the EIP concept is on maximizing economic, environmental and social benefits and minimizing risks to park management, companies and the community.
- The clustering of companies is a core element to allow for the development of industrial synergies within PIMSA and with its surrounding regions, as well as a mechanism to reduce and streamline the need for utility infrastructure and associated costs (e.g. roads, water and energy, effluent treatment, waste management, port facility), the resulting efficiencies also helping to attract new tenants.

STAKEHOLDER ENGAGEMENT

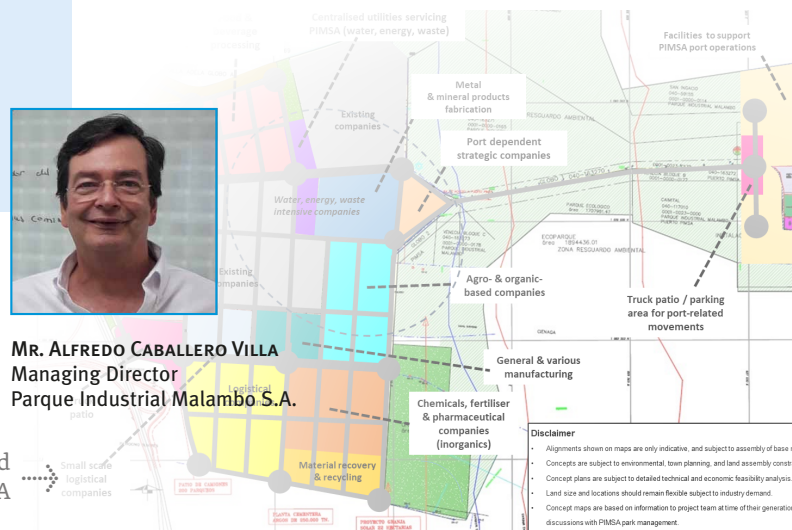
The assignment was undertaken in collaboration and under the guidance of the management team of Parque Industrial Malambo (PIMSA).

“The EIP concept design allows PIMSA to transition into its next phase of economic and industrial development through the optimization of existing and future infrastructure/utilities, risk mitigation, the enhancement of industrial synergies, and the benefits associated with industrial clustering.”



MR. ALFREDO CABALLERO VILLA
Managing Director
Parque Industrial Malambo S.A.

Proposed industry clustering and precinct concept for PIMSA





KEY INTERVENTIONS

Ancón Industrial Park is a greenfield development, located about 25 kilometres north of Lima.

- A sustainability review of the Master Plan documentation was undertaken to provide a detailed analysis of the economic, environmental, and social sustainability of the Ancón Industrial Park.
- Practical inputs were provided for the sustainable development of the park.

SUCCESS FACTORS

- The assignment focused on issues of critical importance for the development of Ancón Industrial Park and PRODUCE (e.g. attracting SMEs, establishment of a technology park/zone, realistic environmental targets, and understanding of the business case and risks).
- The development of practical solutions and recommendations that were clearly defined by stakeholder groups (e.g. PRODUCE, and the construction and development company, park operation and management).

OUTCOMES & IMPACTS

- The report presents a set of policy and technical recommendations for the sustainable design, construction and park management of Ancón Industrial Park, including sustainability-related bidding criteria for the park construction and management model.
- The study will guide decision-making by the Ministry of Production of Peru (PRODUCE) and its stakeholders as to the sustainable development of the park.

STAKEHOLDER ENGAGEMENT

- The study was undertaken under the supervision of the Ministry of Production of Peru (PRODUCE), as part of the UNIDO technical assistance to the National Programme for Productive Diversification.
- Further stakeholder engagement processes as part of the future planning and development of the industrial park will be undertaken by PRODUCE.



MR. MARCOS ALEGRE CHANG
Vice Minister
Ministry of Environment (MINAM)

“The sustainable industrial park model that is promoted globally by UNIDO is an excellent opportunity to increase competitiveness and business profitability, as well as to generate dynamic industrial growth, applying the concepts and practices of Circular Economy.”

Multi-stakeholder consultation in Peru

6 KEY INSIGHTS FROM THE EIP PILOT PROJECTS

The key insights derived from the EIP Pilot Projects are summarized below. It should be noted that this does not represent an exhaustive list, rather more detailed insights and their success factors have been

captured in various publications published as part of the Pilot Projects (see Sections 4 and 5 of this publication).



TABLE 1: SUMMARY OF KEY LEARNINGS FROM UNIDO EIP PILOT PROJECTS

<p>SCOPING EIP INTERVENTIONS</p>	<ul style="list-style-type: none"> • SUITABILITY OF INDUSTRIAL PARKS: It is critical to understand the context and suitability of existing industrial parks. The selection and scoping process identifies the suitability of committed industrial parks, as well as the right type of interventions, to ensure a successful transformation to internationally acceptable EIP models. • SUCCESS FACTORS FOR SCOPING EIP INTERVENTIONS: The availability of data and willingness to share necessary information in a transparent manner; capacity available for the implementation of RECP solutions and industrial synergies, on a company and park level; and selection of fit-for-purpose indicators.
<p>AWARENESS-RAISING</p>	<ul style="list-style-type: none"> • LOCAL OWNERSHIP AND INDEPENDENCE: UNIDO and international experiences have demonstrated that it is easier to raise awareness if an independent entity (e.g. university or consultant/s) leads this process, helping to add credibility of the process. • CONTINUITY AND COHERENCE OF THE PROCESS: EIPs are continually evolving, as are their stakeholders. Thus, it is crucial to ensure that all relevant stakeholders are informed of developments throughout the stages of an EIP.
<p>POLICY SUPPORT</p>	<ul style="list-style-type: none"> • PRIORITIZE POLICY INTERVENTIONS BASED ON BENEFITS, COSTS AND RISKS: It is important to try to and generate “quick-wins” to encourage continued support for the policy process. • APPLY MULTI-STAKEHOLDER AND INTEGRATED APPROACHES: EIP policies typically span a range of thematic areas, therefore their formulation, implementation and monitoring require a high degree of inter-agency collaboration within government, but also with the business community and civil society groups. • WORKING WITH CHANGE AGENTS: Working with change agents in influential ministries and regional institutions to develop, integrate and implement EIP policies (or any other policy intervention) is critical to create impact. • ADDRESS POLICY IMPLEMENTATION AND ENFORCEMENT CHALLENGES: The overall challenge of effective governance, policy implementation and enforcement of regulations remains in many countries. It is therefore important to also address policy mainstreaming, effectiveness and enforcement activities.
<p>PARK MANAGEMENT STRUCTURES</p>	<ul style="list-style-type: none"> • STRONG LEADERSHIP AND COMMITMENT: An EIP managing body needs strong leadership, an efficient structure, transparency and a commitment to strong and responsive stakeholder dialogue (e.g. investors, tenant companies, government agencies and local communities). • STRATEGIC APPROACH TO DETERMINE MOST SUITABLE PARK MANAGEMENT MODEL: As each management model presents advantages and disadvantages, it is important to set-up a strategic approach to decision-making related to park management to find the best option. • COST, BENEFIT AND RISK SHARING MODEL: It is critical to have an effective and sustainable model to recover and share costs and benefits associated with common infrastructure, utilities and park services in EIPs. Financial incentives can be in place to attract foreign investment. Incentives should progressively be replaced by full cost recovery and cost/benefit sharing models. • ENSURE GOOD GOVERNANCE: Distinct from the operational aspect of managing an EIP, good governance addresses the regulatory aspect of industrial parks. Full compliance with local, national and international standards in the area of environmental protection and social development need to be upheld.

UPSCALING RESOURCE EFFICIENCY AND INDUSTRIAL SYNERGIES

- **EXPERTISE:** A strong grounding in cleaner production and industrial synergy methodologies and their implementation is required. RECP training materials are relatively well developed. Identification and evaluation of industrial synergies can be more challenging, as multidisciplinary competencies are required.
- **VIABLE TECHNOLOGY AND EQUIPMENT:** Modification and investment in technologies are often required to implement RECP solutions and industrial synergies. Without a suitable and proven technology available to treat, convert or transport a by-product, a synergy project would not be feasible.
- **FEASIBLE DISTANCES:** This is generally a crucial factor as transportation can make up a significant proportion of the costs to enable an industrial synergy.
- **RETURN ON INVESTMENT:** The implementation of RECP solutions and industrial synergies need a favorable return on investment to be considered a “low-hanging fruit”, as often the decision as to whether or not to invest is competing with investments in other areas.
- **RECOGNIZE THE FULL SET OF BENEFITS:** The benefits of RECP and industrial synergies often go beyond return-on-investment, as the benefits can also cover risk mitigation, improved productivity and improved environmental and social performance.
- **REGULATIONS:** Regulations can help improve resource efficiencies at company and park levels. However, in some countries, regulations can also be a barrier to the development of industrial synergies if these by-products are considered to be waste, and thereby subject to stringent regulations.
- **TRUST AND ENABLING ENVIRONMENT:** Many RECP solutions and industrial synergies cannot be developed without collaboration within/between companies and park management.

PERFORMANCE MONITORING AND BENCHMARKING

- **SOLID BASELINE:** It is important to perform baseline audits to assess the current state of the industrial system and surveys, and to establish indicators that are reviewed over time.
- **ALLOCATE CLEAR RESPONSIBILITIES:** There needs to be an institution with coordination responsibility for the park monitoring and performance system. This is most often the park management unit.
- **BALANCED FOCUS ON ECONOMIC, ENVIRONMENTAL AND SOCIAL IMPACTS:** The concept and definition of EIPs reflect an equal importance given to the three pillars of sustainable development.
- **BE FLEXIBLE AND PREPARED TO REVISE:** Working with performance indicators is and should be a continuous learning and improvement process. There is value in observing the same indicators over several years, but there is also a need to review and revise indicator frameworks regularly to properly reflect emerging issues and new priorities.
- **LINK TO EXISTING INDICATOR SETS USED BY OTHER STAKEHOLDERS:** Indicators selected to measure the progress towards EIPs should be in line with already existing indicator and monitoring systems (e.g. quality management system operated by park management) to avoid the creation of duplicative systems.

CAPACITY-BUILDING

- **ADAPTATION TO LOCAL CONTEXT:** Every industrial park is unique (e.g. park size, industry mix in park, community concerns, business opportunities, etc.), and therefore each park requires customized capacity-building activities.
- **LEARNING AND BENCHMARKING:** EIPs can often learn from other countries’ experiences and share lessons learnt with others. Collaboration in international networks and platforms can provide valuable insights.

CONTRIBUTION OF EIPS TO SUSTAINABLE CITIES

- **AWARENESS AMONG LOCAL AUTHORITIES AND COMMUNITIES:** Awareness-raising is crucial as local authorities will often make the final decision to develop urban industrial synergies based on local support or opposition to a park. It has often been found that local sentiment either for or against an urban industrial park will be crucial in the eventual success or failure of an industrial park. It is therefore crucial to involve communities to ensure acceptance and that they will use services offered by the EIP.
- **EFFICIENT URBAN WASTE COLLECTION SYSTEM AND WASTE CHARACTERIZATION:** An efficient waste collection system is an important success factor to enable effective urban industrial synergy solutions in cities. The local population also has a strong influence on waste quality through source separation.

SPATIAL PLANNING AND ZONING

- **STRATEGIC EIP PLANNING APPROACH:** EIP concept planning provides a strategic approach to review and to attract anchor tenants to industrial parks; to facilitate industrial synergy development; to refine industry zoning and clustering for available industrial land; and to optimize existing and future infrastructure and utilities.
- **KEEP FLEXIBILITY:** It is important to recognize the uncertainties regarding industry types locating to industrial parks and to incorporate maximum flexibility in their planning and development, rather than locking in clustering scenarios at the design stage, with limited information on future industries to locate to the industrial park.
- **INDUSTRY CLUSTERING:** Clustering of industries allows for the development of (urban-) industrial synergies, as well as a mechanism to reduce the need for utility infrastructure and associated costs. Industry clustering should be based on multiple parameters, including resource use, risks, transport needs, lot size, and potential synergies.
- **APPLICABILITY:** A thorough spatial planning and zoning process is applicable to greenfield and brownfield parks. The location of a new park should be carefully considered and a comprehensive master plan needs to be developed that encompasses and balances economic, environmental and social considerations, opportunities and risks. Brownfield parks are often subject to new developments that can affect their spatial planning and zoning (e.g. encroaching residential developments, new infrastructure, community/governmental pressures).

7 WHAT'S NEXT?

The case for scaling-up the EIP Pilot Projects

Scaling-up is important for facilitating comparable outputs with significantly lower per unit inputs, as well as smarter, more efficient methods and tools to achieve desired outcomes. It leads to better quality outputs, for more people over a wider geographic area, more rapidly, with lasting results. It also reflects a concern for the extent of the impact in terms of sustainability and equity.

The EIP approach shows great potential to be further developed to provide a solid foundation for leveraging country level activities. To add weight to this, financial institutions have also shown great interest in supporting the development and implementation of EIPs.

The EIP concept provides an integrated top-down (e.g. through policy support) and bottom-up approach

(e.g. through pilot parks) towards Resource Efficient and Cleaner Production (RECP), industrial and infrastructure synergies, strengthening park management, contributing to healthy environments and spatial planning and zoning.

By targeting EIPs, three levels of governance can be embedded in interventions at the country level, namely (1) Individual companies and park management (micro); (2) Service providers and intermediary agencies (meso); and (3) Governments (macro).

The increasing relevance of EIPs warrants continued and scaled-up interventions by UNIDO to enable developing and transition economies to benefit from the implementation of EIP concepts, methods, techniques and policies.

The Global Eco-Industrial Parks Programme (GEIPP)

The work on EIPs outlined in this publication was undertaken by UNIDO as part of the Global RECP Programme (2012 - 2018).

These activities can be considered as a first step towards the mainstreaming of the EIP concept, which forms the basis of the Global Eco-Industrial Parks Programme (GEIPP), which started in early 2019, funded by the government of Switzerland through SECO.

The objective of the GEIPP is to demonstrate the viability and benefits of greening industrial parks by improving the resource productivity and the economic, environmental and social performance of businesses, thereby contributing to inclusive and sustainable industrial development in the participating developing and transition economies. An overview of the outcomes of the GEIPP is described in Figure 8.

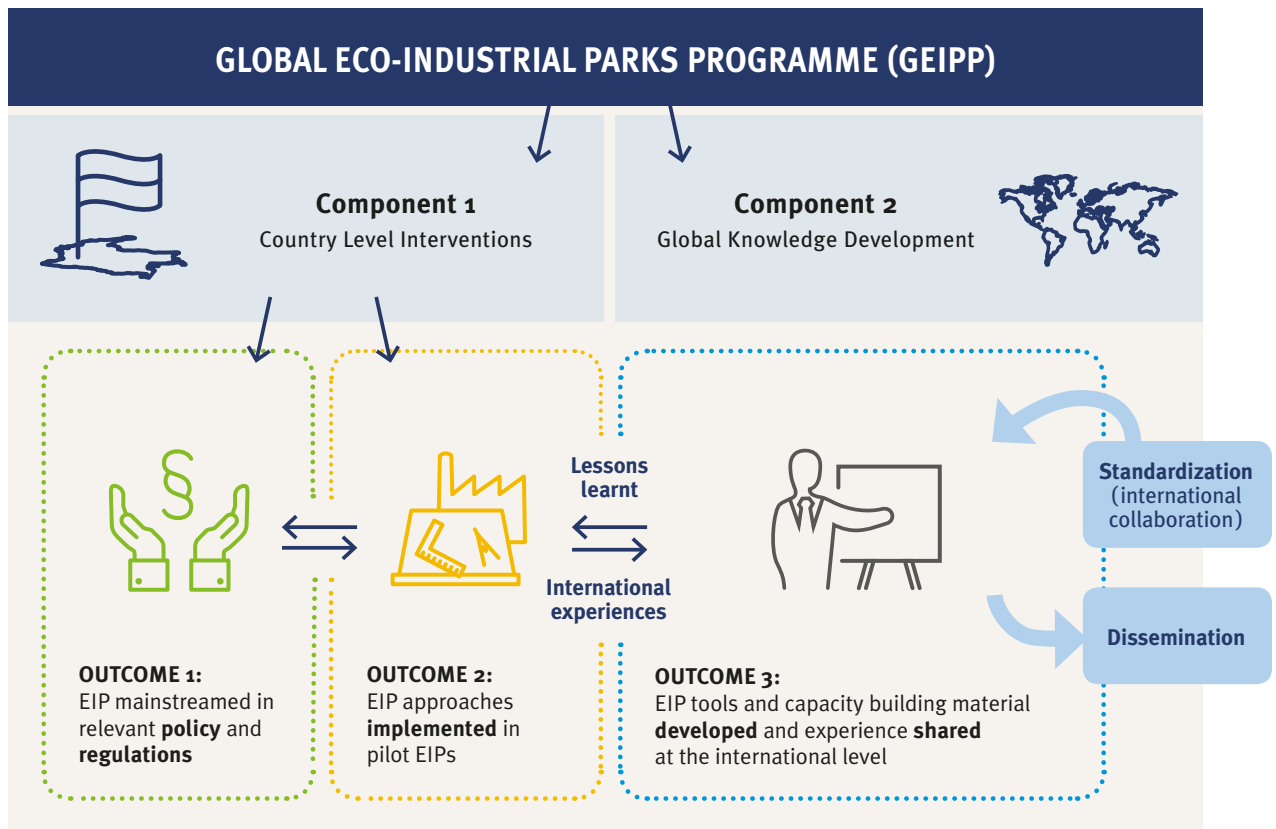


Figure 8: Approach of Global EIP Programme

THE PROGRAMME OUTCOMES ARE SPLIT INTO TWO COMPONENTS:

COMPONENT 1 (Country level interventions) will implement tailor-made initiatives in four countries: Colombia, Peru, Ukraine and Viet Nam.

Two outcomes will be targeted by this component:

- **OUTCOME 1: EIP incentivized and mainstreamed in relevant policy and regulations** leading to an increased role of EIP in environmental, industry and other relevant policies at the national levels in participating countries. Activities such as stakeholder mapping, policy review and capacity-building of key institutions, stakeholders and service providers, will strengthen relevant national institutions.
- **OUTCOME 2: EIP opportunities identified and implementation started**, with environmental (e.g. resource productivity), economic and social benefits achieved by

enterprises. The implementation of EIP opportunities will be supported by service providers leading to a reduction of the environmental footprint of businesses, and increases in their resource productivity and economic performance. Benchmarking of industrial parks, capacity-building and technical support provided to help identify RECP and industrial synergies, opportunities, are examples of activities that will be undertaken.

COMPONENT 2 (Global Knowledge Development) will focus on the development of specific EIP tools and the dissemination of lessons learnt from international experience. This component will build upon activities undertaken during the previous Global RECP Programme and will further advance collaboration between UNIDO and other leading international organizations working on EIPs (e.g. World Bank Group and GIZ).

Expanding into sustainable cities

Environmental concerns are far from being limited to industrial activities. Because of rapid urbanization, particularly in developing countries, it is expected that almost two-thirds of the world's population will live in cities by 2030⁹. Cities can mitigate environmental impacts per capita thanks to more efficient shared services, infrastructure, resource supply and recycling systems¹⁰.

This is relatively similar to the effect of EIPs, which also reduce environmental impacts and which increase the resource efficiency of the industrial sector through supply chain, utility, by-product and service synergies.

The development and implementation of sustainable cities covers many facets (e.g. transportation networks and mobility, buildings, food systems, lifestyle, land planning, etc.). If “a sustainable city serves the best interests of industries”, EIPs contribute largely to the development of such cities by providing joint infrastructure and industrial urban synergy options.

The key contributions of EIPs to sustainable cities include:

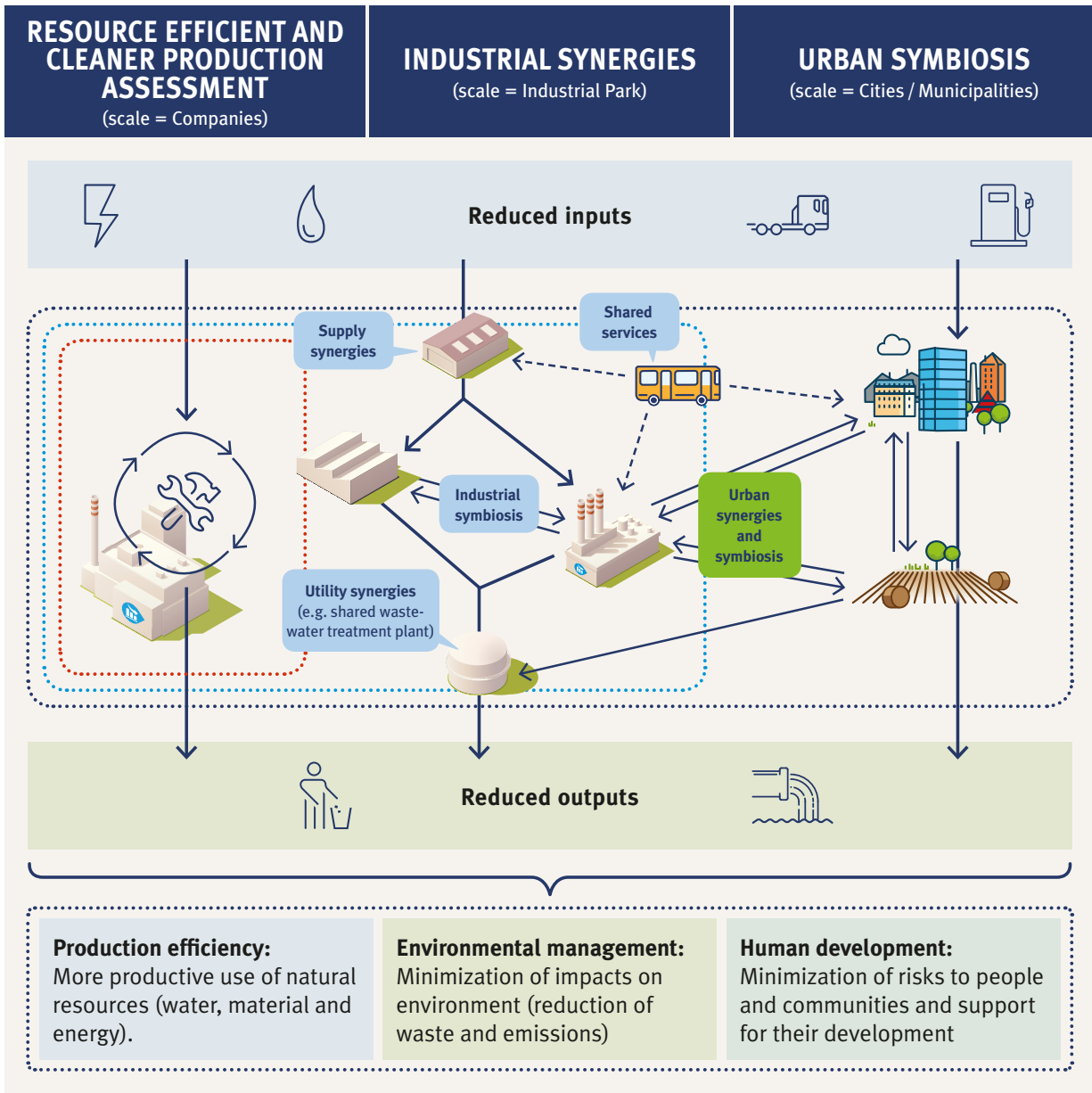
- a) Common infrastructure and utilities servicing both residential and industrial developments (e.g. wastewater treatment plants, power supply, waste collection).
- b) Processing, recovery and recycling of the city's waste by industries (e.g. old tires as alternative fuel in cement plants, reprocessing of electronic waste).
- c) Use of reprocessed products (e.g. recycled wooden products, processed compost) and by-products from industries by surrounding municipalities (e.g. waste heat).

The term “urban-industrial synergies” is used to describe these interlinkages between industries and cities or municipalities (see Figure 9).

As evident from the country highlights of the EIP Pilot Projects, work on EIPs can be extended beyond their physical boundaries to interact with neighboring industries, other industrial parks and municipalities/cities. As part of the Global EIP Programme, these linkages will be deepened and expanded.

⁹ UNIDO (2016). Sustainable cities: Hubs of innovation, low carbon industrialization and climate action.

¹⁰ UN HABITAT (2015). Habitat III issue papers: 16: Urban ecosystems and resource management.



Icons: Truck by Sergey Novosyolov, Gas pump Edwin Prayogi M, Waste bin by Ricardo Cardoso (Naum Project)

Figure 9: Integration of companies, industrial parks and cities¹¹

¹¹ UNIDO (2017). Implementation Handbook for Eco-Industrial Parks.

WHAT CAN UNIDO OFFER?

UNIDO welcomes the opportunity to discuss options and available support on EIPs with interested stakeholders. The types and level of support offered will depend on the specific local needs and context of the industrial park.

For questions and technical advice on the implementation of EIPs, please feel to get in touch with us at EIP@unido.org.

