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EU4Environment
Green Economy in Eastern Partner Countries

Eco-Industrial Parks Advancement Guide



Action implemented by:



About EU4Environment Action

The “European Union for Environment” (EU4Environment) Action aims to help the EU’s Eastern Partnership countries preserve their natural capital and increase people’s environmental well-being by supporting environment-related action, demonstrating and unlocking opportunities for greener growth, and setting mechanisms for better management of environmental risks and impacts. The Action is funded by the European Union and implemented by five partner organisations: OECD, UNECE, UNEP, UNIDO and the World Bank, between 2019 and 2024. For further information about the Action, please visit www.eu4environment.org. For further information about RECP in Ukraine, please visit www.recpc.org.

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Table of Content

ACRONYMS AND ABBREVIATIONS	2
1. Introduction	3
1.1. About the EIPs Advancement Guide	3
1.1.1. Objective	3
1.1.2. Target users and application	4
1.2. Overview of the EIP concept	4
1.3. The EIP concept	5
1.4. Global growth of EIPs	6
1.4.1. Need for EIPs and their potential benefits	8
2. EIP development	11
2.1. International EIP framework at a glance	12
2.2. Tools for EIP development	13
3. The EIP concept in the EaP countries	14
3.1. Bright prospects for EIPs in EaP regions	14
3.2. Country profiles	14
3.2.1. Armenia	14
3.2.2. Azerbaijan	15
3.2.3. Belarus	17
3.2.4. Georgia	19
3.2.5. The Republic of Moldova	20
3.2.6. Ukraine	23
2.3. Eco-Industrial Parks driving competitiveness and differentiation – case studies	24
4. Recommendations for replication and EIP advancement in EaP countries	25
4.1. Overview	25
4.2. The replication of EIP in EaP countries: Lessons from Moldova	25
4.3. The EIP advancement plan for the EaP countries	35
4.3.1. Governance and stakeholder engagement	35
4.3.2. Policy and regulation	41
4.3.3. Technical aspects, monitoring, and evaluation	43
4.3.4. Financing mechanisms	46
4. Conclusions & recommendations	48
ANNEX 1	
INTERNATIONAL CASE STUDIES:	
Eco-Industrial Parks driving competitiveness and differentiation	54

ACRONYMS AND ABBREVIATIONS

EaP: Eastern Partnership countries

EIA: Environmental Impact Assessment

EIP: Eco-Industrial Park

ESG: Environment, Social, and Governance

IP: Industrial Park

FEZ: Free Economic Zone

GDP: Gross Domestic Product

GGI: Green Growth Indicators

GiZ: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

GEIPP: Global Eco-Industrial Parks Programme

IS: Industrial Symbiosis

OECD: Organisation for Economic Co-operation and Development

PPP: Public-Private Partnership

RECP: Resource Efficient and Cleaner Production

SEA: Strategic Environmental Assessment

SIP: Sustainable Industrial Parks/Estates

SEZ: Special Economic Zones

SECO: State Secretariat of Economic Affairs

SMGP: Single Market for Green Products

SME DNC: Small and Medium Entrepreneurship Development National Centre of Armenia

SMEDA: Support to SME Development in Armenia

SPP: Sustainable Public Procurement

UNEP: United Nations Environment Programme

UNECE: United Nations Economic Commission for Europe

UNIDO: United Nations Industrial Development Organization

VAT: Value Added Tax

WBG: World Bank Group

YCRDI: Yerevan Computer Research and Development Institute

1. Introduction

The “European Union for Environment” (EU4Environment¹) Action aims to help the Eastern Partnership (EaP) countries: Armenia, Azerbaijan, Belarus, Georgia, the Republic of Moldova, and Ukraine to preserve their natural capital and increase people’s environmental well-being by supporting environment-related action; demonstrating and unlocking opportunities for greener growth; and setting mechanisms to better manage environmental risks and impacts.

The Action is funded by the European Union and implemented by five partner organizations: the Organisation for Economic Co-operation and Development (OECD), the United Nations Economic Commission for Europe (UNECE), the United Nations Environment Programme (UNEP), the United Nations Industrial Development Organization (UNIDO), and the World Bank, based on a budget of approximately EUR 20 million. The Action implementation period is 2019-2024.

The present project in Moldova is dedicated to assessing the feasibility of converting existing industrial parks (IPs) and free/special economic zones (FEZs/SEZs) in the region to Eco-Industrial Park (EIP) according to the definition of the World Bank, GIZ, and UNIDO. It focuses on conducting an analysis of existing IPs, FEZs, and SEZs in Moldova and assessing possible ways to incorporate best practices for converting them to EIPs. It also aims to develop a set of recommendations to “green” existing parks in two pilot sites and to extrapolate the lessons learned during those exercises to other EaP countries.

1.1. About the EIPs Advancement Guide

1.1.1. Objective

This EIP Advancement Guide aims to promote the positive impacts of the EIP framework methodology. The main objective of this guide is to support the national stakeholders of the EaP countries in creating a favourable environment for the development of EIPs and national sustainable industrialisation level to:

- Develop a shared understanding of the key characteristics of EIPs and their implementation.
- Interpret the EIP framework in the context of EaP countries.
- Provide recommendations to potentially develop a national EIP framework: governance and stakeholder engagement, policy, regulation, monitoring, and evaluation of technical implementation and financing mechanisms.

This document brings together relevant information from the EIP manual and international guidelines combined with the practical examples from various Global Eco-Industrial Parks Programmes (GEIPP)² (with a focus on Ukraine); past EIP experiences in countries such as Nigeria, South Africa, Vietnam, Senegal, and the United Kingdom; as well as lessons and recommendations from the project activities in Moldova and Belarus.

¹ More information: www.eu4environment.org

² The Global Eco-Industrial Parks Programme (GEIPP) objective is to demonstrate the viability and benefits of Eco-Industrial Park approaches in scaling up resource productivity and improving economic, environmental, and social performances of businesses, and thereby contribute to inclusive and sustainable industrial development in the participating developing and transition economies. GEIPP is structured into two main components: component 1: Country Level Interventions, component 2: Global Knowledge Development. The country-level interventions are being implemented in [Colombia](#), [Egypt](#), [Indonesia](#), [Peru](#), [South Africa](#), [Ukraine](#) and [Viet Nam](#).

1.1.2. Target users and application

The key beneficiaries of this guide are **governmental institutions in the EaP countries** looking to tackle sustainability issues at an industry and industrial park level to develop or adapt current industrial park-related policies; and **public and private sector stakeholders** who are involved in the actual development and improvement activities of EIPs.

The target users are:

- Industrial park administrators, operators, or managers
 - Governments and regulatory agencies responsible for the development and functions of industrial parks, SEZs/FEZs, or similar areas
 - Financial sector and funding agencies
 - Industries and businesses (tenant/resident companies) operating in the industrial parks
- The EIP Advancement Guide is aimed at national stakeholders and experts from the six EaP countries using examples from Belarus, Moldova, and Ukraine. It can be presented and disseminated at regional EIP events. This guide will be useful for governments, policymakers, and IPs in the EaP countries to gain a better understanding of the EIP concept, its advantages and potential barriers, and as a decision-making tool for long-term sustainability in IPs.

Intended audience	Gaining a better understanding of the EIP concept	Gaining regional context through relevant examples	Potential advantages and barriers of EIPs	Decision-making tool for short-, medium- and long-term sustainability initiatives	Inform investment decisions, funding allocation, and access to funding
IP administrators	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Government and regulatory agencies	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Financial sector and funding agencies	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Resident/Tenant companies in the IPs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

1.2. Overview of the EIP concept

UNIDO defines an EIP as 'a dedicated area for industrial use at a suitable site that ensures sustainability through the integration of social, economic, and environmental quality aspects into its siting, planning, management, and operations'³. Development institutions, such as UNIDO, the World Bank, the International Finance Corporation, and GIZ, have been working with national and regional entities to drive the implementation of EIPs in countries with emerging economies, while other nations, such as China, Japan, Germany, and Denmark, have been pioneers in adopting the concept. UNIDO, along with the World Bank and GIZ, has jointly published the '**International Framework for EIPs**' (version 2.0 from 2021), which provides a set of performance indicators for industries to operate in perfect symbiosis with each other, considering the environmental, social, and economic welfare of the surrounding community and the companies involved.

EIPs play an increasingly important role in promoting sustainable industrial growth with reduced environmental and social risks, while also balancing company revenues. The major beneficiaries of EIPs are the companies and their employees; local communities; and governments at a regional and national level. By transitioning from IPs to EIPs,

³ [International Framework for Eco-Industrial Park, Version2.0 \(2021\)](#)

involved actors benefit from ecosystem services which can further the concept of a Circular Economy at an industrial level. More details on the EIP concept, the global drivers of EIP, and the benefits of EIPs can be found in the handbook, [‘An International Framework for Eco-Industrial Parks’](#).

1.3. The EIP concept

There are several definitions for EIPs. Aside from UNIDO’s definition presented previously, the other pertinent definition is provided by Lowe (2001)⁴, which is referenced by many international organizations working on the topic. It states that EIPs are ‘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’. Lowe’s definition points to the role of EIPs to support the application of Resource Efficient and Cleaner Production (RECP) on a broader level, and for making use of the potential of industrial symbiosis (IS). EIP definitions have evolved to reflect the importance given to the three pillars of sustainable development, namely environment, social, and economic. Based on international experiences, key components of EIPs are presented in Figure 1. As shown in the figure, RECP and IS are part of the EIPs approach.



Figure 1 Key components of EIP²

The types of economic, environmental, and social benefits from EIPs vary greatly and extend beyond the conventional business case benefits. The benefits are not just commercial but also strategic, leading to reduced exposure to risk, increased competitiveness, business development, production continuity, and a better reputation with key stakeholders.

EIPs enable companies to benefit from greater collaboration and exchanges within companies (between management, technical and environmental staff, financial mechanisms, etc.), as well as between companies, government, and service providers. Companies are enabled collectively to turn environmental problems into business solutions by using resources efficiently and cooperating through a shared infrastructure. In short, the EIP concept is about creating more resource-efficient and cost-effective industrial zones which are more competitive and risk-resilient.

⁴ [Eco-industrial Park Handbook for Asian Developing Countries Report to Asian Development Bank, 2001](#)

1.4. Global growth of EIPs

Current status of EIPs

EIP precursors could be found in European industrial zones as early as the late nineteenth century. However, as a result of resource constraints and high energy costs, they only truly began to emerge in the post-World War II period in Denmark, Germany, and Finland in an unplanned, organic fashion.

One such park is Kalundborg Park, located in Copenhagen, Denmark. Established in 1961, it witnessed early examples of EIP-related activities, such as an agreement between an energy company located in the Kalundborg, named Statoil (then Esso), and a gypsum plant, Gyproc. Statoil agreed to supply the excess gas produced by its operations straight to the ovens of Gyproc for drying their plasterboards. Shortly thereafter, Statoil also linked its water pipe with another energy firm, Dong Energy, for a collaborative use of the water supply⁵. This partnership came to be known as the 'Kalundborg Symbiosis' and laid the foundation for more businesses to join and benefit from the mutual exchange of materials and resources.

The Harjavalta Park in Finland is yet another example of an EIP which formed organically as a result of the strong social network between the original five firms in the industrial zone and the city of Harjavalta. While the driving force was the political landscape of the time, all five firms shared a common goal of improving their economic, environmental, and social performance. Currently, a symbiotic relation exists between the park, which supplies energy to the city of Harjavalta for district heating, and the city which supplies the park with its local resources and wastes to use as fuel⁶.

In the 1990s, other European countries and non-European developed countries such as the United States, Japan, and Canada began to incorporate EIP concepts, in part or entirely, into the design of their industrial zones. Some developing countries, including China and India, began to follow suit. During this time, the majority of EIP⁷ interventions focused on waste management, wastewater treatment, energy supply, and pollution reduction⁸.

Japan, China, and the Republic of Korea expanded their EIP efforts in the early 2000s, bolstering them with national policies to increase their competitiveness in global markets. In Europe, many countries started pursuing the sustainable industrial parks/estates (SIPs/SIEs) concept, by focusing primarily on waste and energy symbiosis, and applying the concepts of RECP and a Circular Economy. European IPs and SEZs, including ports, started integrating the concept of sustainability (Environmental, Social, and Economic parity) into their infrastructure and functions. By the second decade of the century, EIPs had become a prominent global tool for new industrial development, while retrofitting activities continued in over 40 countries.

Since 2015, UNIDO has implemented EIP pilot projects in six countries under the global RECP programme (China, India, Morocco, South Africa, Colombia, and Peru). Moreover, an EIP country project is implemented in Viet Nam, funded by the Global Environment Facility (GEF) and SECO. As of 2018, there are over 250 self-claimed EIPs globally, located primarily in Europe and parts of Asia (in China, Japan, and Korea)⁹.

EIPs can evolve in two ways: self-organized and constructed, or designed. Self-organized EIPs, such as the Kalundborg EIP in Denmark, have emerged spontaneously without any policy management or administrative plans to foster cooperation. Governments and the private sector, on the other hand, are beginning to recognise the benefits of increased resource and energy efficiency on a country's overall industrial competitiveness, including the added value that EIPs can provide.

Many nations are becoming more conscious of green approaches in manufacturing and competitiveness. Bangladesh, China, Colombia, Egypt, India, Japan, Morocco, South Korea, Thailand, Turkey, and Viet Nam are among them. Figure 2 presents the IPs present in these countries.

5 <https://nordregio.org/nordregio-magazine/issues/industrial-symbiosis/industrial-symbiosis-in-kalundborg/>

6 <https://beroc.org/upload/iblock/423/423d3a08baa7935148d6af27308d0150.pdf>

7 The term 'Eco-Industrial Parks' (EIP) is relatively new, but the concept has been around for several decades, often known by different terminologies e.g., sustainable industrial estates, sustainable industrial zones, eco-industrial clusters, or similar. The underlying concept of making more sustainable industrial parks remain the same, possibly evolving in certain areas over time. Some reference to EIP in the late 1990s could be reference to a similar concept, but possibly a different terminology.

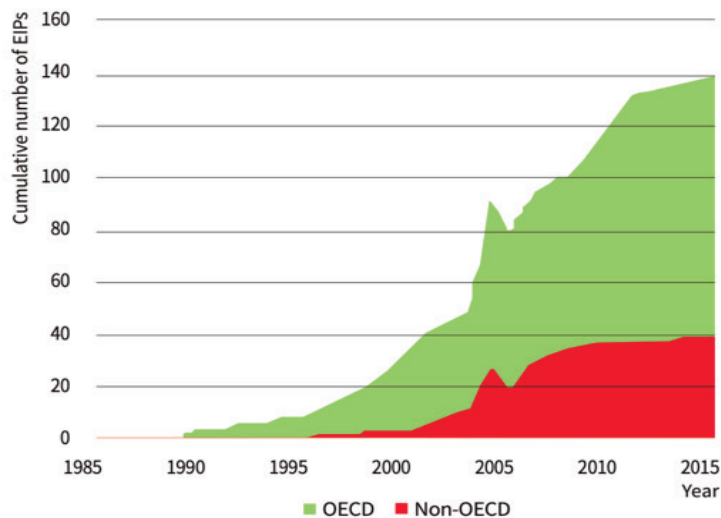
8 [Mainstreaming Eco-Industrial Parks](#)

9 <https://www.worldbank.org/en/news/feature/2018/01/23/eco-industrial-parks-emerge-as-an-effective-approach-to-sustainable-growth>



Figure 2 IP status in several countries across the world

These countries are now developing a national EIP framework to scale up inclusive and sustainable industrialization¹⁰. Figure 3 below presents the increase in the number of new EIPs being developed globally over time.



Source: Kechichian and Jeong (2016).

Figure 3 Global growth of EIPs¹¹

The EaP countries have also taken initial action and built momentum within the EIP, RECP, and Circular Economy areas by focusing on industries and IPs, as well as the development of local networks and expertise. Key steps in this direction include:

- Six RECP booklets were published to help SMEs in the EaP countries learn how to become greener (in English and the respective national languages).
- 12 RECP Clubs were established in Armenia (Armavir and Gyumri), Azerbaijan (Baku and Ganja), Belarus (Borisov and Orsha), Georgia (Kakheti and Mtskheta), Moldova (Cahul and Găgăuzia) and Ukraine (Khmelnitskiy)

¹⁰ <https://hub.unido.org/about-eco-industrial-parks>

¹¹ [Mainstreaming Eco-Industrial Parks, Worldbank, 2016](#)

and Poltava). In total, they bring together over 60 enterprises that benefit from peer coaching sessions organised in 12 training modules. These Clubs support SMEs in developing individual RECP strategies and action plans.

- RECP Assessments: the monitoring for implementing RECP measures for the alumni enterprises of the EaP GREEN project was completed in Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine, resulting in the publication of 50 business cases. 67 demonstration enterprises from the food, construction, plastics, metallurgy, and fisheries sectors have completed RECP assessments in Armenia, Azerbaijan, Georgia, Moldova, and Ukraine.
- Georgia and Ukraine are the pilot countries for introducing the EU's SMGP (Single Market for Green Products) initiative. The applicability of the SMGP concept and its main tool, the Product Environmental Footprint (PEF) methodology, is also planned to be evaluated in Azerbaijan, Georgia, and Moldova. The SMGP concept helps industries in Europe tackle the confusion and mistrust that is accompanied with several environmental labels available globally. It provides a single, simple approach that is widely accepted and would demonstrate the environmental credentials of a company. This SMGP concept is closely linked to RECP, and thus also to EIP, through:
 - o The establishment of a common methodological approach to enable anyone to assess, display, and benchmark the environmental performance of products, services, and companies based on a comprehensive assessment of the environmental impacts of products and services over their life cycle
 - o A more precise understanding of consumer behaviour and the environmental footprints of products and services, at every life cycle stage
- Training and awareness-raising activities have been undertaken in Armenia, Azerbaijan, Belarus, Georgia, and Ukraine. Examples include a regional Environment Management Systems webinar, trainings on Energy Management Systems (conducted for over 30 RECP experts in Armenia and Georgia), and four online sessions on RECP in Belarus on the application of cleaner production as a profit-oriented strategy for SMEs.
- About 26 experts in Georgia and Moldova have been recognised for completing the full-scale training programme on RECP. The coaching of these experts and other representatives from enterprises in Armenia, Azerbaijan, and Ukraine has also been completed.
- Information meetings on RECP activities have been completed in all EaP countries, all interspersed with events which took stock of the achieved results (eight years of implementing RECP in Ukraine) and presented plans for linking RECP with academia.

1.4.1. Need for EIPs and their potential benefits

Needs

Global buyers are increasingly demanding sustainably sourced and processed products, with improved environmental performance (in terms of resource use and overall lifecycle impact). Governments, regulators, and non-governmental organizations are also putting pressure on industrial parks to be more environmentally and socially responsible. For example, some of the largest garment producers (and brands) in the world require garment manufacturing factories (located in countries such as India, China, and Viet Nam) to meet minimum environmental, social, and governance requirements. Additionally, if such factories are based in IPs, there is a requirement for the IP to also demonstrate its responsibilities towards safety, security, infrastructure, waste, and water management. Support from UNIDO, World Bank, and many such organizations has helped several IPs transition to EIPs, paving the way towards an increased resilience and higher confidence from buyers.

IP developers and operators strive to provide differentiated services to tenants in ways that are distinct from other types of industrial parks. Many industries and businesses are also willing to take voluntary actions in competitive markets to fulfil their perceived economic, social, and environmental responsibilities.

There is also an increasing pressure on IPs to become more socially and environmentally responsible. For example, one of the targets set by the board and shareholders of a pilot Park in Moldova is for it to become an EIP by 2030.

Because EIPs are inextricably linked to industries and competitiveness, the demand for these parks is driven by the need for economic and resource efficiency, as well as other business benefits.

With a greater emphasis on global climate change mitigation and a more concrete approach to carbon pricing, the economics of climate action are shifting. This means that businesses and CEOs have a greater responsibility to address climate change in their operations and supply chain.

Benefits

International best practises show that the types of economic, environmental, and social benefits provided by EIPs vary greatly, and extend far beyond the conventional business case benefits¹².

These advantages are not only commercial, but also strategic, resulting in:

- Lower risk exposure
- Increased competitiveness
- Business development
- Production continuity
- Better reputation among key stakeholders

EIPs allow businesses to benefit from increased collaboration and exchanges within their own organizations (management, technical and environmental staff, finance, etc.), as well as between businesses, the government institutions, and service providers. Companies can also collectively turn environmental problems into business opportunities by utilising resources efficiently and cooperating via shared infrastructure.

Figure 3 below presents the various environmental, economic, and social benefits which can be derived from EIPs.



Environmental benefits

- Reduction of pollution levels
- More efficient use of resources (e.g., raw materials, water, energy)
- Preservation and protection of biodiversity and nature
- Reduction, reuse, and recycling of wastes
- Improved management of chemical and hazardous substances in an eco-industrial park



Economic benefits

- Direct and indirect employment creation
- Cost savings due to reductions in waste disposal, resource, and energy consumption
- Increased competitiveness
- Some eco-industrial parks report higher foreign direct investment in their parks
- Indirect employment creation through skills upgrading and training
- Technology transfer
- Demonstration effect arising from the application of best practices
- Regional development



Social benefits

- Creation of local jobs
- Better working and labour conditions
- Local community well-being and community outreach
- Improvement in gender equity
- Crime prevention and better security
- Creation of a social infrastructure like vocational training centers, skills development training, as well as broader community services

Figure 3 Economic, environmental, and social benefits of EIPs¹³.

¹² 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.

¹³ [Achievements, Good Practices and Lessons Learned from Thirty-three Industrial Parks in Twelve Selected Emerging and Developing Countries - UNIDO](#)

In most of the cases examined in a UNIDO comparative study, it was noted that drivers such as access to finance, technical assistance, the role of government agencies, policies, and economic benefits were all key in enabling EIP development. The drivers highlighted in international cases are, for the most part, unique to the respective industrial parks. However, as a leitmotif, the main driver for EIPs can be linked to increasing business competitiveness.

Drivers and barriers

Industries operating in well-designed and well-managed EIPs are better positioned to take advantage of park-level resource efficiency, value-adding, and risk-mitigation measures and services. In this sense, the UNIDO global assessment contains a comprehensive list of the drivers and barriers to EIP development¹⁴.

From an industrial competitiveness perspective, the main drivers for EIPs are:

- Reducing operating costs and improving productivity
- Greening supply and value chains
- Mitigating climate change
- Improving resource supply security, management, and efficiencies (e.g. materials, water, energy)
- Reducing business risks by recognizing environmental and social risks as economic risks
- Addressing environmental and social topics relevant to the local community and government to ensure long-term licensing for the operation of industrial parks

¹⁴ UNIDO, 2016a. Global assessment of Eco-Industrial Parks in developing and emerging countries: Achievements, good practices and lessons learned from 33 industrial parks in 12 selected emerging and developing countries. United Nations Industrial Development Organization, Vienna, Austria.

2. EIP development

A *Practitioner's Handbook for Eco-Industrial Parks: Implementing the International EIP Framework*, developed jointly by UNIDO, the World Bank Group, and Germany's Deutsche Gesellschaft für Internationale Zusammenarbeit (German Development Corporation) (GIZ), recommends the following step-by-step process for the development of a national EIP framework.

Table 1: Overview of the Step-by-Step Process for Developing National EIP Frameworks Steps

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. 	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. 	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. 	National government regulators, in partnership with coordinating agencies, and regional/local entities.

**Figure 4 Overview of the step-by-step process for developing national EIP frameworks;
Source: a practitioner's handbook for EIPs**

The approach recommended in the practitioner's handbook was drawn upon and adapted to the EaP context in the process of developing this guide. The guide is informed by learnings from the course of the project in Moldova, where activities were carried out primarily focusing on the first two steps of the process laid out in the practitioner's handbook. At the same time, the activities are drawing upon and building further on the progress made during the previous stages of related RECP and EIP projects in Moldova. The approach taken in this guiding document is an in-depth foray into steps 1 and 2 (as described in Figure 4, above), followed by a proposed action plan, recommendations, and guidance towards the development of a national EIP framework (which also includes aspects from steps 3 and 4, as described in Figure 4, above).

The approach to develop a guide consists of the following steps:

- Stakeholder mapping
- Policy analysis
- Stakeholder engagement and capacity-building
- Technical diagnostics – EIP baseline assessments of IPs against the international EIP framework
- Assessment of the international EIP framework against the national context

2.1. International EIP framework at a glance

The EIP framework describes the performance requirements for EIPs within four key categories, namely: park management performance, environmental performance, social performance, and economic performance. An overview of the framework is presented in Figure 5, below. This framework provides the basis for defining and setting prerequisites and performance requirements for EIPs. In addition, EIPs must comply with all applicable local and national regulations. They must also meet the broader requirements set out by this framework. The performance requirements for EIPs are defined so that environmental and social commitments go beyond prevailing regulatory requirements in the country.

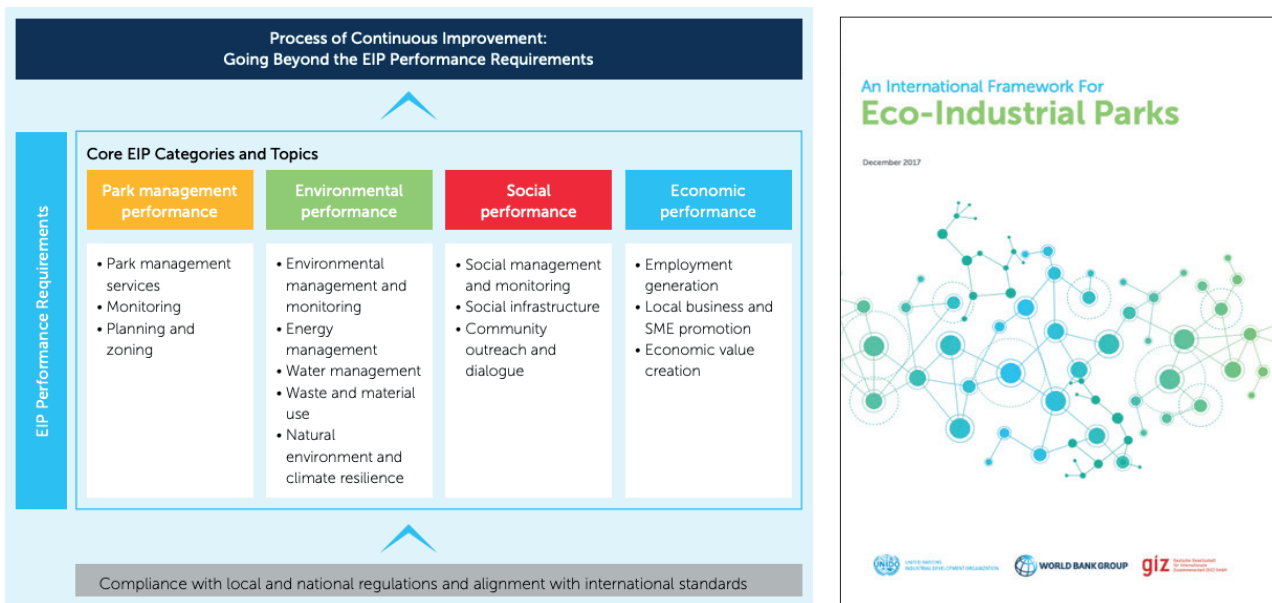


Figure 5 An International Framework for Eco-Industrial Parks (UNIDO, WBG, GIZ; 2021)

2.2. Tools for EIP development

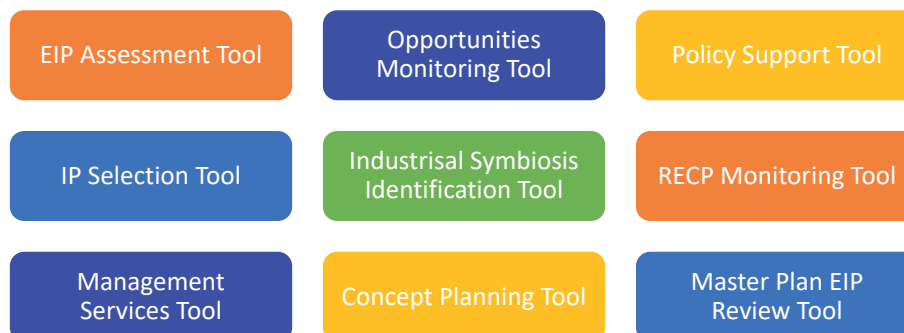
To aid the implementation of EIP strategies, a number of handbooks, brochures, tools, and materials have been created, and UNIDO has worked with international organizations to develop a shared vision for EIPs. For example, close collaboration among UNIDO, the World Bank Group, and GIZ has allowed for the development of an international framework for EIPs. This framework provides a common understanding of EIPs, as well as a method for defining the minimum EIP performance requirements.

To support the implementation of the international framework for EIPs, the objectives of UNIDO's EIP Toolbox are to:

- Provide a practical set of customized and flexible tools to assist practitioners with the development and implementation of EIPs and related initiatives; and
- Support EIP implementation and decision-making processes in relation to existing and new industrial parks.

UNIDO's EIP Tools	Scope of the tools			
	Existing industrial parks (Brownfields)	New industrial parks (Greenfields)	Technical	Organizational and political
EIP Selection Tool	✓	(✓)	✓	✓
Stakeholder Mapping	✓	✓		✓
EIP Policy Support	✓	✓		✓
EIP Assessment Tool	✓		✓	✓
Industrial Symbiosis Identification Tool	✓	✓	✓	
RECP Monitoring Tool	✓		✓	
Industrial Synergies Monitoring Tool	✓		✓	

The EIP Toolbox contains a set of nine different tools¹⁵:



¹⁵ <https://hub.unido.org/eco-industrial-parks-tools>

3. The EIP concept in the EaP countries

3.1. Bright prospects for EIPs in EaP regions

The European Union's Eastern Partnership (EaP) is made up of six countries (Armenia, Azerbaijan, Belarus, Georgia, the Republic of Moldova, and Ukraine) that cover over one million square kilometres and are home to 74.4 million people. The region is close to major markets such as the European Union, Russia, and Turkey, and it benefits from a large area of agricultural land, as well as significant energy and natural resources. Although the pace of structural reform varies by country, the region as a whole is on a path towards economic transformation, shifting away from a growth model based on large enterprises specialised in intermediary outputs and commodity transformation toward a more diverse and open economic structure¹⁶.

In this sense, the EU-funded EU4Environment Action has carried out the following activities in the EaP region, summarised as country profiles.

3.2. Country profiles

3.2.1. Armenia



Country profile:

Armenia has experienced important economic growth rates over the last decade (7.6% in 2019). Thus, encouraging the private sector to use more resource-efficient production which results in cleaner and more cost-effective products would not only improve environmental management and the economic situation for SMEs, but it would also support a more resilient industry in Armenia.

The Armenian Government is committed to improving the environmental performance of its economy, as evidenced by the National Development Strategy 2014-2025 and the Second Phase of the Energy Efficiency Action Plan for Armenia 2017-2018. To realise such goals, industrial development that can continue to increase productivity, job creation, and economic growth opportunities for SMEs, while reducing resource consumption and environmental performance is required¹⁷.

Policies pertaining to Industrial development¹⁸:

Free Economic Zones Act (in effect since 2011): The overall goals of FEZs are to promote foreign investment, develop new and advanced technologies, increase Armenian exports, and generate employment and economic growth. Armenia's first FEZ is based in the Yerevan Computer Research and Development Institute (YCRDI) and the Mars Motors Manufacturing Company, and opened in July 2013. All zone residents are provided with a "one-stop shop" for

¹⁶ SME Policy Index: Eastern Partner Countries 2020

¹⁷ ECP -Armenia

¹⁸ [Review of the state of development of clusters in EaP countries](#)

services, including tax breaks, exemption from import and export duties, profit tax, property tax, and so on. It is too soon to assess the economic impact of this recent initiative.

The establishment of the **Small and Medium Entrepreneurship Development National Centre of Armenia** (SME DNC of Armenia) in 2002 is another major structural initiative for the Armenian Government. SME DNC assists SMEs through the following programmes: 1) Loan guarantee provision; 2) Credit interest rate partial subsidy; 3) Information and consulting support; 4) Goods and services market promotion; 5) Start-up business support; and 6) Programme for implementing R&D activities for introducing innovations, new technologies, and products.

In addition, the EU co-financed, and the GIZ implemented a project entitled **“Support to SME Development in Armenia”** (SMEDA), initiated in 2016 with the objective to improve the national business and investment climate, and support the creation and development of SMEs to enable broad based growth. Among other support components, it also focuses on improving the design and management of economic clusters in Armenia.

Finally, the industrial policy in Armenia is led by the **Strategy of Export-led Industrial Policy (2011)**, which initially focused on key export sectors (such as brandy manufacturing, pharmaceuticals and biotechnology, and precision engineering). The UNECE report in 2014 described those sectors as “good candidates for industry-science linkages”.

Status of EIP/RECP/IS activities:

EU4Environment¹⁹:

From 2013 to 2017, UNIDO demonstrated the cost-saving potential of the Resource Efficient and Cleaner Production (RECP) methodology in the EU-funded programme EaP GREEN by conducting RECP assessments in 55 Armenian companies and identifying RECP measures that would allow them to save up to 1 million Euro per year on resource, energy, and water consumption. This project revealed the prospects of Circular Economy-centred business models for the industry, demonstrating that investing in RECP is beneficial to both businesses and the environment.

3.2.2. Azerbaijan



Country profile:

Azerbaijan’s economy is dominated by the oil and gas industry, which accounted for around 38% of GDP and 90% of exports in 2018. The ongoing expansion of gas production (through the construction of the Southern Gas Corridor between Azerbaijan and Europe for 2020-21) as well as efforts to develop non-oil sectors should support export capacity and growth. Its key trade partners are the EU (54% of total exports in 2018), Russia, and Turkey. Russia accounts for a comparatively small share of total exports but is the most important destination for non-hydrocarbon exports²⁰.

Investments in industrial parks and sites in Azerbaijan have reached \$3.7 billion, leading to significant growth in the production of goods and export operations. 58 residents have invested a total of more than 6.4 billion manats in the country’s industrial parks and sites. In addition, 10,100 permanent jobs have been created since the launch of the first industrial park in 2011. Over the past decade, production and exports in the industrial zones reached \$4.2 billion and \$1.35 billion, respectively. In the first half of 2022, the production of goods increased by 52.95 percent as compared to the previous year, and settled at \$765 million. At the same time, exports stood at \$320 million over the same period²¹.

Policies pertaining to industrial development²²:

Azerbaijani authorities have implemented several state programmes on the economic development of sectors and regions, one of which is the **State Program for Development of Industry in Azerbaijan in 2015-2020** which shall implement the priority directions defined in the development concept (or strategy), **“Azerbaijan 2020: Look into**

¹⁹ <https://recp.am/hy/news/5>

²⁰ SME Policy Index: Eastern Partner Countries 2020

²¹ <https://globuc.com/news/industrial-parks-and-sites-in-azerbaijan-attract-over-3-7-billion-in-investments/>

²² [Review of the state of development of clusters in EaP countries](#)

the future". The mentioned documents underlined the will of the Government to transform the country into a "strong regional industrial hub"; to engage in economic specialisation; and to encourage the "development of the economy on the basis of clusters". The Governmental approach towards cluster policy is based on the establishment of special economic zones and favourable conditions.

The Government also adopted a new document – **The Strategic Roadmap for Perspectives of the National Economy of Azerbaijan**, which covers the development of dozens more sectors until 2025, including industry, research, and innovation. Here, the objective is to diversify the economy and industry in Azerbaijan, and develop a competitive and sustainable non-oil sector as a strategic priority for the Government. In addition, sectoral strategic roadmaps were also adopted to develop the sectors of heavy industry, mechanical engineering, specialised tourism, and production and processing of agricultural products.

Status of IP/RECP/IS activities:

Industrial parks in Azerbaijan²³:

At the time of writing, five industrial parks – Sumgait, Balakhani, Mingachevir, Garadagh, and Pirallahi, and four industrial sites – Neftchala, Masalli, Hajigabul, and Sabirabad were operating in Azerbaijan. The residents of these industrial parks are exempt from property, land, and profit taxes for 10 years from the date of their registration. They are also free from paying value-added tax (VAT) and customs duties for machinery, technological equipment, and facilities imported for production purposes, for 10 and 7 years, respectively, from the time of being granted residency status.

Meanwhile, the Government has established two new industrial parks in the Azerbaijani territories liberated from the Armenian occupation in 2020, namely the Aghdam and Jabrayil districts.

Construction at the Aghdam Industrial Park started in 2022 on a territory measuring 190 hectares (470 acres). Nine enterprises have already been granted residency status at the park. The priority areas of the park are the production of construction materials, packaging of agricultural products, canned fruits and vegetables, meat and dairy products, production and processing of feed and fertilizers, as well as refrigeration, storage, and other services. Residents are expected to invest a total of nearly \$30 million in the Aghdam Industrial Park.

The foundational stone of the "Araz Valley Economic Zone" Industrial Park in Jabrayil was laid in October 2021. The country's authorities have granted 200 hectares (494 acres) of land for the park's construction. Once completed, it will comprise agricultural processing, industrial, social, and technical zones. A logistics and trade centre, warehouse complexes, wholesale and retail facilities, a truck park, customs point, filling stations, and car and other equipment repair points will also operate in the park. The resident enterprises will have the necessary conditions to produce construction materials, pack agricultural products, as well as manufacture and process canned fruits and vegetables, wine, meat, and silk, among others.

Eco-industrial park: Balakhany IP²⁴

The main purpose of establishing this park in 2012 was to provide favourable conditions for potential entrepreneurs and investors interested in the recycling industry to set up their businesses. The park area measures a total of 7 ha, of which 23,460 m² will be for production and 3,000 m² will be for infrastructure. The Government provided all the required support for enterprises to set up mechanical processing and production equipment. The park was strategically established close to the Balakhani landfill, a waste-to-energy plant, as well as to the main highway, to provide easier access to the market for transporting raw materials and finished products. Planned infrastructure development is also underway to attract potential entrepreneurs and investors for green businesses, particularly recycling industries.

23 <https://globuc.com/news/industrial-parks-and-sites-in-azerbaijan-attract-over-3-7-billion-in-investments/>

24 <https://tamizshahar.az/en/projects/3>

3.2.3. Belarus



Country profile:

The economy of Belarus is dominated by large state-owned enterprises, which generated nearly one-third of total value-added in 2016 (IMF, 2019). Manufacturing accounts for 41% of GDP in Belarus, followed by agriculture, and wholesale and retail trade, collectively accounting for 10% of the GDP in 2017 (Belstat, 2019). Belarus, as a member of the Eurasian Economic Union, is heavily reliant on trade with Russia, which accounted for 38% of its total exports in 2018. The country also benefits from subsidised Russian energy and preferential access to the Russian market. The 2015-16 recession gave way to a modest recovery, with growth of 2.5% in 2017 and 3% in 2018, respectively²⁵.

Policies pertaining to industrial development²⁶:

In 2014, the Government adopted the **Concept for Setting up and Developing Industrial Innovation Clusters in the Republic of Belarus** (approved by the Regulation of the Council of Ministers of 16 January 2014, No. 27). It was developed as a set of measures to promote entrepreneurship in the country in line with the President's Directive of 31 December 2010, No. 4. The concept assesses the existing industrial infrastructure and identifies the prospects and organizational and economic mechanisms for stimulating cluster development until 2020.

The purpose of the concept is to create conditions for improving the competitiveness of the national economy through the promotion of cluster development. In line with this objective, the following concrete tasks of the state cluster policy have been defined:

- Establish a regulatory framework for cluster development;
- Identify the priority areas for setting up and developing clusters;
- Develop conditions for the training of managers and specialists in cluster development;
- Develop conditions for implementation of cluster initiatives and projects;
- Set up and maintain a system of state support for cluster development

Status of EIP/ RECP/ IS activities²⁷:

The National RECP Centre in Belarus completed its assessment of industrial site No. 4 of the FEZ "Mogilev" and FEZ "Minsk" and developed a list of priority, corrective actions to aid it in its transition to an EIP. This was done as part of the EU4Environment Action, which used the international EIP framework to introduce EIPs. The FEZ "Mogilev" territory, which consists of 18 industrial sites covering a total area of 3,339.4 hectares, has an industrial production structure dominated by the chemical and woodworking industries.

Currently, the six FEZs established in the Republic of Belarus comprise over 420 enterprises with around 137,000 employees. The revenues generated from the sale of goods and services from these enterprises amounted to over 7.7 billion € in 2019, of which, 7 billion € (91%) belonged to the industrial sector.

FEZs are the best candidates for the establishment of EIPs in Belarus. Each has a park administration entity (FEZ Administration), separate production sites (plots), a master plan, and a functioning monitoring system. To become an EIP, a company must expand its monitoring system of resident activities (in terms of environmental performance), and they must create a climate change mitigation and adaptation plan. A water-saving plan should also be developed, as well as certification for the park's environmental and energy management systems. According to an EIP overview, the current compliance of FEZs in Belarus with EIP prerequisites is 50%, and the economic performance with EIP prerequisites is at 75%. The performance of the park management is at 67% of the EIP prerequisites, and the social and

²⁵ SME Policy Index: Eastern Partner Countries 2020

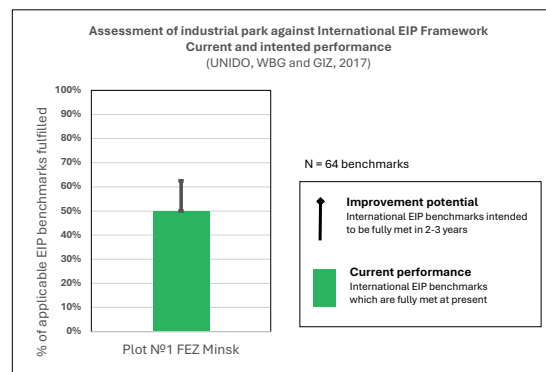
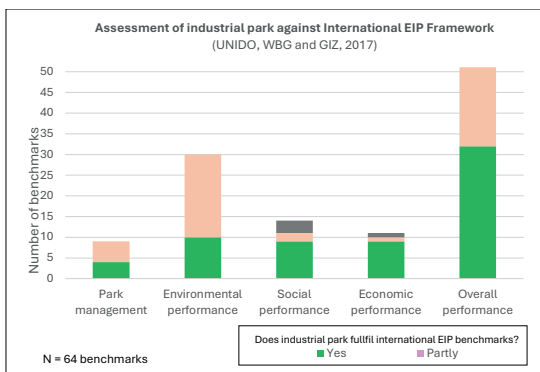
²⁶ [Review of the state of development of clusters in EAP countries](#)

²⁷ <https://www.eu4environment.org/news/introducing-environmentally-friendly-industrial-parks-in-belarus/>

environmental performances are at 50% and 16.7%, respectively.

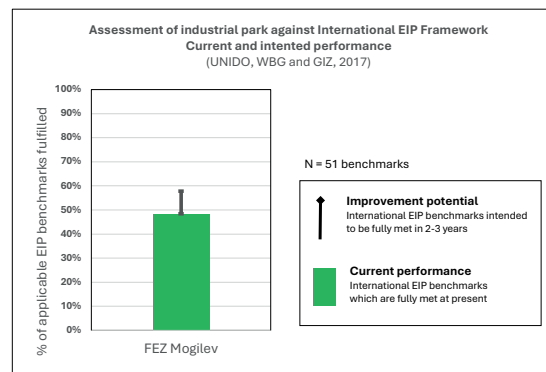
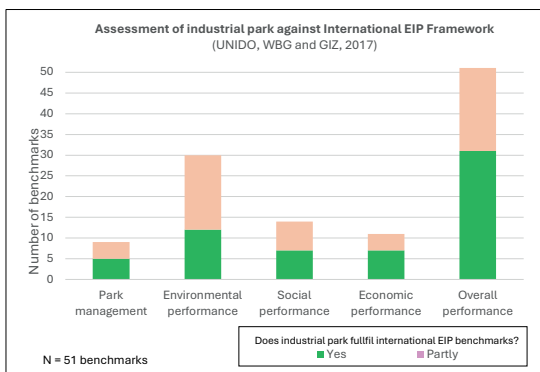
A series of working meetings were held with the administration of the FEZ “Minsk” in September and October 2020, which is a territory of 23 plots, covering a total area of 2,791.45 hectares. Based on the results of the discussions and the preliminary assessment, the most suitable site for the creation of an IIP was determined: site No. 10, with an area of 604.4 hectares and 13 resident enterprises. The performances of FEZ Minsk and FEZ Mogilev were evaluated in accordance with the international IIP framework. This was followed by a series of online workshops for resident businesses, the development of a corrective action plan to guide the FEZ management’s IIP decision-making, and other related activities.

The IIP pre-feasibility assessment for plot site No. 1 FEZ Minsk showed that the FEZ met 50% of the indicators (32 out of 64), with the potential of to improve up to 62.5%. The largest gap and improvement potential was seen in their environmental performance.



A similar assessment carried out for FEZ Mogilev demonstrated the following results:

The FEZ met 30 of the 64 indicators currently (~47%) and had the potential to meet another 7 IIP indicators in the next 2-3 years.



3.2.4. Georgia



Country profile:

Georgia's economy is based on a relatively small industrial sector and on agricultural processing, which accounted for 22.6% and 6.8% of GDP in 2017, respectively. The country imports most of its natural gas and oil products. Georgia is located at the centre of an important regional transit corridor, and transport services accounted for 24.6% of commercial service exports in 2017. New transport infrastructure, including the Anaklia Deep Sea Port, and the recent signature of trade agreements with the EU and China, are expected to transform the country into a logistics hub. In 2018, the EU became the first export destination of Georgian products, accounting for 22%, while exports to Russia represented only 13% of total exports (United Nations, 2019)²⁸.

Policies pertaining to industrial development²⁹:

The Ministry of Economy and Sustainable Development of Georgia established the **Industry Development Group** which is responsible, amongst others, for elaborating a concept for cluster development and that will facilitate the involvement of private business in this system using Public-Private Partnership (PPP) principles in collaboration with public and private organizations. The other public bodies involved in the elaboration of the cluster concept are the Ministry of Education and Science, the Ministry of Regional Development and Infrastructure, and the Ministry of Agriculture of Georgia.

In addition to this, at the time of writing, the German operating company Sequa, together with the German Corporation for International Cooperation (GIZ) in Georgia, started a project that aims to support the development of Georgia's export strategy and the establishment of clusters in different industrial sectors (apparel and textile, furniture, and the plastic industry). The project is set to run from September 2016 to July 2017.

The development of a green economy in Georgia is actively supported by the Government. It approved the development strategy "Georgia 2020" in 2014, which included the promotion of green growth as one of its key objectives. It also developed a Green Growth Policy Paper in 2016. In 2014, Georgia and the European Union signed an association agreement that came into force in 2016. It encompasses objectives related to sustainable development and environment. It also introduces a preferential trade regime through the Deep and Comprehensive Free Trade Area, which Georgia signed to achieve its gradual economic integration into the EU internal market.

Status of EIP/RECP/IS activities:

EU4Environment³⁰ is helping Georgia facilitate national policy dialogues on Green Economy; further legal reforms on Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) laws; promote the introduction of RECP practices in SMEs; provide advisory services to establish Sustainable Public Procurement (SPP) and eco-labelling policies; develop a waste management strategy; identify priority environmental sectors for policy reform; support public environmental expenditure management; contribute to green innovation within SMEs; strengthen capacities for the establishment of extended producer responsibility (EPR) schemes; promote compliance assurance; assess and reinforce administrative capacity of salient governmental institutions for improved environmental management; and develop green growth indicators (GGIs). The following are RECP-related activities that have been carried out in Georgia³¹:

- Two RECP Clubs were established in Lower Kartly and in Kakhetiy; they developed RECP action plans for 17 enterprises

28 SME Policy Index: Eastern Partner Countries 2020

29 [Review of the state of development of clusters in EaP countries](#)

30 <https://www.eu4environment.org/where-we-work/georgia/>

31 [EU4Environment Country Profile 2021-2022 – Georgia](#)

- Over 40 individuals SMEs were awarded participation certificates upon completion of coaching workshops on the RECP methodology within the RECP Clubs
- Industrial waste mapping was developed in two regions, Rustavi and Zestaponi, helping enterprises consider practices that minimise waste, as well as options for industrial symbiosis
- An RECP training programme helped 13 Georgian experts to gain theoretical and practical knowledge for in-plant RECP assessments
- The RECP demonstration programme for food and beverages, construction materials, and other industries helped identify profitable RECP measures related to energy consumption. Reduction of energy losses and better efficiency of energy conversion were the main priority areas for ten RECP Demonstration Companies

Georgia is home to free industrial zones (FIZs) which provide significant advantages to businesses including modern infrastructure, low rent, tax benefits, simple business structure, etc. However, the concept of EIP is still in an introductory stage, with RECP actions being individually implemented, as described above.

Georgia's Free Industrial Zones (FIZs)



Source: Georgian Railway

3.2.5. The Republic of Moldova



Country profile³²:

Moldova relies heavily on the export of basic agricultural products, such as vegetables. These make 27% of its total export base, making the country particularly vulnerable to variations in food prices in key exports markets, such as the EU (to which nearly 70% of its exports were directed in 2018). Additionally, the Moldovan economy is highly dependent on diaspora remittances (20.16% of GDP in 2017), particularly from Russia (32% of total remittances in 2017) (World Bank, 2019).

Policies pertaining to industrial development³³:

At the time of writing, the need to support cluster formation for industrial development was mentioned among other subjects in several strategic documents. These include the:

³² SME Policy Index: Eastern Partner Countries 2020

³³ [Review of the state of development of clusters in EaP countries](#)

- Programme of the Government of the Republic of Moldova, “European Integration: Freedom, Democracy and Welfare”;
- Industry Development Strategy until 2015, approved by Government Decision No. 1149 on 5 October 2006 (p.6.2; Annex No.13 Action Plan, Chapters V, VI, VII);
- Small and Medium Enterprise Sector Development for 2012-2020 (Government Decision No. 685, dated 13 September 2012);
- National Innovation Strategy of the Republic of Moldova, “Innovation for Competitiveness” 2013-2020 (Government Decision No. 952, dated 27 November 2013);

Status of EIP/RECP/IS activities:

In the EaP countries, EU4Environment is working with selected industrial sites to help them transition towards EIPs – two of them are located in the Republic of Moldova³⁴.

This assignment for undertaking the EIP feasibility assessment took place in the Free Economic Zone Valkaneş and Industrial Park Tracom, which have been designated as pilot areas. The activity is performed by UNIDO with the support of international EIP experts from DSS+ (formerly Sofies) and national experts, in agreement with the Ministry of Economy and Infrastructure and the Ministry of Agriculture, and the Ministry of Regional Development and Environment of Moldova.

The activities began in July 2021 with a [two-day online workshop](#) on the methodology of RECP and industrial symbiosis. Soon after, the two sites received [approval to take part in the EIP feasibility assessment](#). Since then, active collaboration has been fostered among the stakeholders, leading to the first field mission to FEZ Valkaneş and IP Tracom at the end of June 2022.

Currently, the IP laws in Moldova do not contain any specific requirements on waste, energy, water, climate change, or even social aspects. This makes it challenging to regulate and facilitate better environmental management, especially as each IP/FEZ has different types of ownership and administration. Moreover, within some administrations, there are also intermediate agencies overseeing the tenant companies, making decision-making harder and control mechanisms less efficient.

During the field mission, along with visits to the two sites, several rounds of meetings also took place with the Ministry of Agriculture and of Regional Development and Environment of Moldova. Based on the meetings, the project team was able to identify several deficiencies and challenges at the two sites, including site observations, and the ongoing EIP assessment process.

In the case of IP Tracom (established 11 years ago on a historic tractor manufacturing site), at the time of writing, there are 71 tenant companies working in various sectors (construction, technology, vehicle repairs, paper-based products, textiles and garments, food production, pharmaceutical activities, thermal energy, furniture production, and logistic services). A state of the art IT hub is also located there, making IP Tracom a highly attractive destination for technology companies.

As for FEZ Valkaneş (a sub-zone with nine active onsite industries), tenant companies are offered customs-free business for transactions outside Moldova. This makes it a very appealing site for tenant companies to attract investments and initiate partnerships.

Current challenges

At the time of writing, reflective challenges in both IP Tracom and FEZ Valkaneş are those related to development plans, the need to improve the infrastructure to attract new tenants, and the limitations within legal requirements (when it comes to waste management). In addition, larger events (the pandemic, followed by the Russian invasion of Ukraine) have had a substantial negative impact on the tenant businesses, prompting them to oppose added costs that may result from investments towards becoming an EIP.

On its own, IP Tracom is facing growth challenges while the new development plan is under design. Much of the infrastructure (including the electric grid) is several decades old and would need upgrading to reduce electricity losses. There is also a strong need to have waste and wastewater management facilities for the tenants – an issue not previ-

³⁴ <https://www.eu4environment.org/news/towards-economic-and-environmental-performance-with-eco-industrial-park-pre-feasibility-assessment-in-moldova/>

ously considered due to a lack of legal clarity and need for funding. Another major challenge is that the administration only has a direct contract with about 50% of the tenants. The rest are subcontracted by existing tenants, thus limiting the control and influence of the administration. The on-site IT hub also attracts many service-based companies (rather than manufacturing ones), but there is an opportunity here to use the IT companies to modernise the park's industrial tenants and help them move towards [Industry 4.0](#) (e.g., smart meters, automated data collection, etc.).

Separately, FEZ Valkaneş has significant challenges in terms of limited infrastructure and facilities to make it attractive (so that the tenant companies are willing to make investments). There are also limitations in terms of legal requirements and the lack of formal facilities for waste and wastewater management. The potential of the administration to convert the FEZ into an EIP is very high, but external investment might be needed.

New and ongoing opportunities

The field mission highlighted several openings for industrial synergies in both IP Tracom and FEZ Valkaneş. For IP Tracom, collaboration could happen in the supply of by-products (paint/pigments); a joint procurement of certain raw materials by neighbouring companies; or by using waste as raw material between two companies (one company becoming a customer of another one through industrial symbiosis, IS). Other concrete examples would be the use of common car-washing services; an e-waste collection hub; using end-of-life wooden pallets to make furniture across the IP; or the common use of electric scooters. Three tenant companies were also visited during the site visit to IP Tracom, namely Alphatherm (construction materials producer), Arama R (furniture producer) and Cartnord (producer of paper and cardboard). All companies already have some well-established examples of RECP: reuse of raw materials; consideration of waste from off-cuts; advanced machinery for energy efficiency, air purified systems, energy (heat) generation from waste; etc.

Several RECP opportunities were also identified by the expert team (wastewater treatment; installation of ultra-filtration units in car repair shops; etc.). Vested to make the transition towards an EIP a reality (a key focus area within its three-layered strategy for growth by 2030), IP Tracom has already started taking steps to increase its safety and improve common spaces, biodiversity, and habitat preservation.

In the case of FEZ Valkaneş, the new administration has taken measures to install security systems across the site. As its sub-zone is extremely large, it has plenty of sites that are occupied by tenants but are not used or are in poor condition. A canal running dry through the middle of the site also showcases the importance of water management in the industrial zone and the nearby areas. A railroad entering the FEZ in various locations provides excellent infrastructure to move goods to different parts of Moldova and neighbouring countries (despite, currently, not being in use). Two tenant companies were also visited: DK Intertrade (a wine and brandy manufacturer) and ICS Terra Impex (construction and insulation materials). Both companies are already implementing some good examples of RECP practices (e.g., sending packaging materials back to customers). In addition, new opportunities can arise to make the FEZ and its operations more resource efficient (baling of waste; reuse of waste pigments; insulation of pipes for coolants, etc.).

Ways forward

Through the pilot sites, the EIP concept provides an integrated approach to embrace RECP and industrial symbiosis. Concomitantly, this path also strengthens the role and oversight of park administrations and contributes to healthy, competitive, and sustainable environments for the tenant industries.

In the case of both IP Tracom and FEZ Valkaneş, the field mission allowed the team to assess and validate the zones' performances towards the international framework for EIPs, and to acknowledge important challenges and opportunities. Both pilots face common, as well as individual struggles in their transition to becoming EIPs, but, at the same time, showcase notable commitments and openings to embrace resource efficiency and foster industrial synergies. Once additional feedback and information are provided from the zones, and the EIP recommendations are finalised, a roadmap for EIPs will be developed. A second mission, conducted at the end of 2022, helped discuss the EIP roadmap and to share the results and lessons learned. This was followed by a regional event where a wide group of stakeholders discussed Moldova's experience with other countries from the EU's Eastern Partnership region.

3.2.6. Ukraine



Country profile:

At the time of writing, Ukraine was the largest EaP economy, accounting for more than 45% of the region's GDP. Industry and agriculture continue to drive the Ukrainian economy, accounting for 24% and 10.2% of GDP in 2017, respectively. GDP contracted by 16% in 2014-15, and the subsequent recovery has been slow but steady. Growth in 2018 was 3.3%, with aggregate GDP in real terms remaining nearly 15% below the peak reached in 2008. The country has 30% of the world's richest black soil, which gives its agricultural industry enormous potential. The EU is an important trade partner, receiving 43% of Ukrainian exports in 2018.³⁵

Policies pertaining to industrial development³⁶:

The first document on cluster policy in Ukraine was prepared in 2008, when the **Concept of creation of clusters in Ukraine** was published by the Ministry of Economy of Ukraine. This document identified the prospects of implementation of the cluster approach in the economy; highlighted the advantages of cluster organization of production / manufacturing for the domestic economy; and defined the conceptual basis of clusters.

The concept proposed to distinguish between four types of clusters:

- Production clusters (especially, in auto, aircraft, and the shipyard sectors);
- Innovation and technological clusters (geographically localized companies linked by the innovation product chains);
- Tourism clusters;
- Transport and logistics clusters

Based on the above-mentioned concept, the **National goal-oriented program for industrial development in Ukraine by 2017** was adopted by the government (2008). Its implementation assumed the set-up of the cluster model in the national economy. It also created some preconditions for the introduction of legal acts, aimed at further developing state cluster policy in the Ukrainian economy.

The draft of the **Strategy of development of high-tech industries by 2025** (prepared by the Ministry of Economic Development and Trade of Ukraine in 2016) lists a series of measures aimed at creating an effective ecosystem of technological parks, along with scientific and industrial clusters. The strategy contains a range of measures designed to bridge the gap between the system of creation and the system of implementation, based on the generated knowledge in innovation and production.

Status of EIP/RECP/IS activities:

EU4Environment is helping Ukraine develop green economy policies; implement RECP in SMEs activities; promote green products, public procurement, and eco-labelling; reinforce compliance assurance and administrative capacity; and develop green growth indicators (GGIs)³⁷.

The following RECP-related activities were carried out:

- Technical visits and assessments of ten enterprises which helped identify RECP opportunities to reduce material inputs and reduce pollution
- Boosting awareness on Circular Economy in Ukraine by distributing RECP brochures, based on business cases for the successful application of RECP, available in English and Ukrainian. A dedicated brochure also present-

³⁵ SME Policy Index: Eastern Partner Countries 2020

³⁶ [Review of the state of development of clusters in EaP countries](#)

³⁷ <https://www.eu4environment.org/where-we-work/ukraine/>

ed RECP perspectives and challenges in the country. The RECP website and associated social media accounts helped promote RECP activities in Ukraine

- The RECP national network was launched at an RECP experts' alumni meeting and Circular Economy kick-off event, which showcased RECP benefits and explored new opportunities for Circular Economy in Ukraine

The **GEIPP Ukraine Project**³⁸ is implemented by UNIDO and funded by the Government of Switzerland through SECO (the State Secretariat of Economic Affairs). The main beneficiary of the Project is the Ministry for Development of Economy of Ukraine.

At the time of writing, the main objective of the project is to demonstrate the viability and benefits of EIP approaches in scaling up resource productivity and improving economic, environmental, and social performances of businesses, thereby contributing to inclusive and sustainable industrial development in Ukraine.

The GEIPP Ukraine Project addressed EIP development in Ukraine through two components:

- **Component 1** aims to mainstream EIP into national policy and create splendid conditions for EIP development in Ukraine. The review of and amendments to the current legislation will be elaborated by the EIP policy working group that was established by the Ministry of Economy of Ukraine
- **Component 2** aims to provide detailed, technical (RECP assessments, industrial synergies identification), and strategic support (EIP concept planning and zoning, performance monitoring, community outreach) of three selected industrial parks (BVAK in Bila Tserkva, AgroMash in Zaporizhzhia, and Patriot in Sumy) to assist their transition to Eco-Industrial Parks.

2.3. Eco-Industrial Parks driving competitiveness and differentiation – case studies

A summary of international case studies that have successfully implemented the Eco-Industrial Park strategy are laid out in Annex 1 of this document. These case studies highlight the overall benefits obtained and can be reviewed by EIP practitioners in EaP countries as examples of **best practices** and **potential for replication**.

The case studies have been presented country-wise with further categorization in terms of early adopters of the concept of EIP, GEIPP countries, and developing economies. In addition, each case study has also been highlighted to showcase the following components and aspects of the Eco-Industrial Park framework, as follows:

- Eco-Industrial Park (EIP)
 - o Park management
 - o Environment
 - o Economic
 - o Social
- Resource Efficiency and Cleaner Production (RECP)
- Industrial symbiosis (IS)
- Urban-industrial symbiosis

38 <https://geipp-ukraine.org/en/pro-proiekt/>

4. Recommendations for replication and EIP advancement in EaP countries

4.1. Overview

Incentivising IPs to becoming EIPs requires a combination of financial, regulatory, and educational measures, as well as continuous collaboration between the involved stakeholders.

The purpose of this action plan is to present a favourable route for the development of EIPs in EaP countries. After developing a shared understanding of the concept (including its characteristics and the expected benefits), this action plan can provide a programme for the execution of new projects and help upgrade existing industrial parks.

This plan (alongside the various other UNIDO guiding documents), is also informed closely by the detailed analysis of the work carried out in Moldova as part of the EU4Environment activity to explore “Eco-Industrial Parks Feasibility in Moldova”, which was dedicated to assessing the feasibility of converting existing IPs and/or FEZs/SEZs in Moldova into EIPs.

4.2. The replication of EIP in EaP countries: Lessons from Moldova

The tables below make some recommendations for replication of EIP in EaP countries based on lessons learned during the EIP pre-feasibility assessments in Moldova.

1. A sustainability model at the core of IPs:

<i>Lessons and examples from Moldova:</i>	<i>Relevance in the EIP context:</i>
IP Tracom, located in Central Chisinau (Moldova), strongly recommends that sustainability and Circular Economy become critical to the existence of EIPs.	Sustainability and resource efficiency (linked to CE) are fundamental and building elements of an EIP. Abiding by the principles of Circular Economy is part of any EIP's code of conduct, and any legally binding agreement between tenant firms and the park authority.

<p>Replication opportunities in EaP countries:</p> <p><i>Government:</i> Develop new policies, or adapt existing policies focused on sustainability (especially environmental and social) at an IP level.</p> <p><i>Industrial Parks:</i> Pro-actively embrace circularity and sustainability concepts to make the IP more resilient, sustainable, and competitive.</p>	<p>Benefits/examples:</p> <p>By putting sustainability at the core of their EIP approach, both pilot sites were able to identify and implement several environmental and social measures in partnership with tenant companies, which led to increased collaboration, interaction, and trust between companies. Additionally, this would lead to potential savings of over €300,000 in the medium-term, and over €1M in the long-term.</p>
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2. Localising the international framework

<p>Lessons and examples from Moldova</p> <p>The set-up of industrial parks in the EaP region as well as the national regulatory and functional contexts are different to other countries. In its current format, many of the EIP indicators were not applicable or relevant to the IPs in Moldova.</p>	<p>Relevance in the EIP context:</p> <p>The international EIP framework is a global framework applicable equally to all countries implementing it, but can be adapted as per the regional needs</p>
<p>Replication opportunities in EaP countries:</p> <p>All stakeholders: Learn from international experiences but adapt the framework to suit the national context to support a strong, positive change.</p>	<p>Benefits/examples:</p> <p>A localised adaptation and interpretation of the framework was more meaningful and relevant and, hence, easier to adopt in both the IPs. There were still several non-applicable EIP indicators, but these would evolve with the evolution of the regulatory framework.</p>

3. The law of the land

<p>Lessons and examples from Moldova:</p> <p>There is a lack of specific and relevant legislation (e.g., hazardous waste, wastewater management, water use, etc.). A lack of regulations, enforcement, or checks results in blatant abuse of waste, water, and resources, as well as direct pollution of air, land, and water. On a social front, there are general policies only at the national level, but nothing specific on health and safety, women's welfare, child labour, etc..</p>	<p>Relevance in the EIP context:</p> <p>EIP principles are based on a strong legal framework and the need to have a baseline of environmental, social, and economic regulation.</p>
<p>Replication opportunities in EaP countries:</p> <p>Government: A need to have an established, applicable, and relevant regulatory framework around key EIP and/or sustainability aspects, including, but not limited to:</p> <ul style="list-style-type: none"> • Waste (hazardous and non-hazardous) • Water (use and discharge) • Energy efficiency (use, renewables, etc.) • Health and safety • Equality, including child labour 	<p>Benefits/examples:</p> <p>A lack of regulation around wastewater management or hazardous waste management in Moldova is currently causing significant water distress and localised water pollution, affecting the environment as well as human health.</p> <p>In other regions (e.g., Viet Nam), strong environmental and social regulations/decrees are catalysing clear action from IPs and tenants.</p>

4. Start with a master plan

<p>Lessons and examples from Moldova:</p> <p>Retrofitting of IPs is a big challenge. There is a need to go back to the 'drawing board' to avail the maximum benefits. A lack of existing master plans will lead to poor EIP planning. Both pilot IP/FEZ are working on their master plans as a matter of priority.</p>	<p>Relevance in the EIP context:</p> <p>For any new and existing industrial park, a master plan (or equivalent planning document) should be developed and reviewed periodically (minimum of every seven years) and updated, if required, to include the following core elements:</p> <ul style="list-style-type: none"> • (based on various risk analyses) essential and efficient infrastructure: onsite and offsite, in particular ensuring access to decent housing; utilities and an adequate transportation network; environmental and social issues; a buffer zone around the park; a procedure to safely locate high risk industries; and cluster synergistic industries and similar. • Integration into the master plan of relevant requirements specified in EIP framework.
<p>Replication opportunities in EaP countries:</p> <p>Industrial park administrations: With the help of experts, they can develop a master plan for brownfield IPs. For greenfield IPs, plan the layout to optimise on the different sectors present at the industrial park. Ensure the minimum requirements of an IP are considered: e.g., security and safety, roads, toilets, fire and emergency services, effluent treatment, waste storage and handling, emergency evacuation, open spaces, etc..</p>	<p>Benefits/examples:</p> <p>Master plans are integral to planning the IP infrastructure and facilities, as well as for placing the tenant companies, to optimise on RECP and industrial symbiosis (e.g., companies in close proximity with each other).</p> <p>A master plan for Calabar Free Trade Zone (CFTZ) in Nigeria was originally developed over 25 years ago. Re-designing this document has led to several potential environmental benefits (identifying opportunities for setting up a CETP, joint waste management and handling, as well as consideration of renewable energy access to the FTZ).</p>

5. Ownership

<p>Lessons and examples from Moldova:</p> <p>Different type of ownership and administrative structures in Moldova led to ambiguity in implementation of environmental, social, and economic indicators.</p>	<p>Relevance in the EIP context:</p> <p>An EIP framework requires a fundamentally strong IP administration which has clear roles and responsibilities.</p>
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<p>Replication opportunities in EaP countries:</p> <p>Government/Ministry: The need for a clear, defined role of the IP administration with corresponding authorities and responsibilities, especially related to the creation of EIPs, will be fundamental.</p>	<p>Benefits/examples:</p> <p>A clear ownership structure was decided before setting up a Sustainable Industrial Parks (SIP) Framework in Ethiopia for IDH.</p> <p>In Hawassa Industrial Park (HIP), and many other IPs in Ethiopia, there is a clear distinction between the role of the government (running and managing the Industrial Park Development Corporation – IPDC), an EIP committee (made up of IP management, tenants, and government officials), and the Ethiopian Investment Commission (which guides bringing new investment to Ethiopia), combined with inputs from tenant companies and cooperation with development co-operation (DC) organizations such as UNIDO, GIZ, and the World Bank.</p>
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6. Contracts & agreements

<p>Lessons and examples from Moldova:</p> <p>One of the pilot IPs had a contract with 51% of its tenants, but the rest of the tenants were sub-let by the main tenant, and hence held no contract or obligations, leading to a lack of visibility of their enterprise, and the potential environmental and social implications. Additionally, these sub-contractors are volatile – they could be active at the present, but could close down on the shortest notice.</p>	<p>Relevance in the EIP context:</p> <p>The EIP framework requires that all firms in the industrial park sign a residency contract, park charter, or code of conduct (depending on what is legally binding for park firms according to the existing legislation in the country) and additional legally binding arrangements that empower the park management entity to perform its responsibilities and tasks, and charge fees (sometimes absorbed in rental fees) for common services. This may include transparent fees for services pertaining to the achievement of EIP performance targets.</p>
<p>Replication opportunities in EaP countries:</p> <p>IP administration: ensure there is a legally binding contract with all tenants, clearly identifying all the obligations of the tenants, and the corresponding responsibility from the IP administration. This should include, but not be limited to waste handling, storage, and management; energy use data; energy efficiency; resource use data; certifications and initiatives; workforce breakdown; training and other data; workforce welfare, etc. IPs can develop a code of conduct (or similar legal document) for specific items such as energy data, waste management, etc.. More information can be obtained from the international EIP framework.</p>	<p>Benefits/examples:</p> <p>From successful international EIP examples, a clear, concise contract should have roles and responsibilities of both (or all) parties concerned, which would include environmental and social responsibilities (e.g., for tenants to segregate and securely store waste near their premises, and for the IP administration to have it collected and safely managed (reuse, recovered, recycled, and prevented from landfill or open burning)).</p>

7. Engaging tenants

<p>Lessons and examples from Moldova:</p> <p>There is a distinct lack of engagement of tenants at the IPs in Moldova, making it difficult for the IP administration to have a clear overview of the current activities, and to gauge any potential for improvement. Regular data are requested and collected for certain parameters such as energy, but all other information is relatively hard to collect.</p>	<p>Relevance in the EIP context:</p> <p>Tenant firms at an industrial park play a crucial part, as they contribute to the challenges, but also to the corresponding solutions. Their pro-active engagement in an EIP's journey is a critical factor.</p>
<p>Replication opportunities in EaP countries:</p> <p>IP administration: Drive strong tenant relations through regular formal and informal engagements through various channels (including contracts, code of conduct, regular IP tenant meetings, community engagements, newsletters, questionnaires/interaction seeking regular data, etc.).</p>	

8. Complex tax structures

<p>Lessons and examples from Moldova:</p> <p>IP Tracom in Moldova levies three types of taxes for: leasing, management, and service. This is complicated and makes it difficult for tenant firms to understand their taxes.</p>	<p>Relevance in the EIP context:</p> <p>EIP framework warrants a simple, yet formal structure between the IP and its tenants.</p>
<p>Replication opportunities in EaP countries:</p> <p>Government: Simplify tax regimes in IPs as well as FEZs to provide an easy-to-implement, and amicable tax structure.</p>	<p>Benefits/examples:</p> <p>A simplified tax and fee structure makes for transparency and improved trust between resident tenants, as well as accountability to use any levied fees.</p> <p>IP administration benefits from being able to relay in detail how the funds are being used (as some of the activities may not be visible to the tenant firms).</p>

9. Energy costs and stability

<p>Lessons and examples from Moldova:</p> <p>The pandemic, along with the recent war, has led to a hike in energy costs across Moldova, putting many companies in debt. Gas prices in October 2022 were nearly seven times that of those in 2021. Whilst this situation may be temporary, IPs and tenant firms must have a higher level of resilience to risks.</p>	<p>Relevance in the EIP context:</p> <p>The EIP framework requires firms in an industrial park to have a risk management framework that: (a) identifies activities which have an impact on the environment, (b) assigns a level of significance to each activity, and (c) has appropriate mitigation measures in place.</p>
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<p>Replication opportunities in EaP countries:</p> <p>Government: Plan a roadmap to achieve NetZero emissions by an agreed deadline. For countries planning to be part of the EU in the coming years, this would be one of the priority criteria.</p> <p>IPs: Consider options for energy recording, energy saving (RECP) at a company level, energy optimisation through industrial symbiosis, including consideration of renewable energy solutions for mitigating climate-related risks.</p> <p>One significant risk to consider for all IPs would be energy availability and stability.</p>	<p>Benefits/examples:</p> <p>To counter the energy crisis resulting from the Russian war of aggression against Ukraine, and to have long-term energy security, several firms in both pilot IP/FEZ have considered solar PV as a source for renewable energy to become less dependent on the increasingly unreliable sources of conventional electricity. At least two companies were in advanced negotiations in this regard, and many more are likely to follow suit. The source of renewables could change depending on the region (e.g., wind, hydro, solar) and there are sufficient technologies available to consider the option(s) best suited to the local weather conditions and environment.</p>
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10. Making IPs an attractive source of investment

<p>Lessons and examples from Moldova:</p> <p>In Spring 2022, the Government of Moldova introduced the amended 'Law of IPs in Moldova (182)' which focuses on the management of IPs and offers other benefits to IPs to make them more attractive to investors. This led to an enhanced effort on pursuing the transition of the IP Tracom to an EIP.</p>	<p>Relevance in the EIP context:</p> <p>An industrial park is as healthy as its tenants. A successful EIP framework strongly positions its industrial parks to have their own identities, niches, and USPs.</p>
<p>Replication opportunities in EaP countries:</p> <p>Government: Continue amending and adapting the law of IPs, extending it to all IPs and FEZs to complement the EIP framework, and to adapt the law to the national context. Position the IP in a favourable light to make them resilient (environment, social, economic, and park management criteria, as per the EIP framework) and to make them attractive destinations for investment and job creation.</p>	<p>Benefits/examples:</p> <p>Globally, IPs are becoming a prominent investment destination for businesses of various sizes for several reasons, including:</p> <ol style="list-style-type: none"> 1. The range of infrastructure provided 2. Cost-efficiency by having economies of scale through geographical concentration of businesses 3. Tax breaks, reduced taxes, and exemptions for attracting companies to invest 4. Access to a skilled workforce 5. Industrial synergies through the clustering effect 6. Inherent advantage of environmentally and socially compliant IPs. <p>By meeting increasing ESG pressure from investors (which can be achieved through the EIP or a similar framework), IPs can further increase their added advantage of being favoured business destinations.</p>

11. Urban mining

<p>Lessons and examples from Moldova:</p> <p>Currently, Moldova does not identify valuable waste resources such as WEEE (Waste Electrical and Electronic Equipment). Setting up a local facility for dismantling and separating downstream fractions could provide a good solution to disposing of this waste stream, while generating jobs and revenue.</p>	<p>Relevance in the EIP context:</p> <p>The EIP framework requires that 100% of untreated industrial waste is sent for sound disposal, while encouraging reprocessing, reuse, and recycling, where possible. Additionally, it mandates that 100% of firms in the park appropriately handle, store, transport, and dispose of hazardous materials.</p>
<p>Replication opportunities in EaP countries:</p> <p>Government: Introduce relevant and implementable policies on waste streams of high concern (such as plastics and e-waste). Invite investors to import or develop indigenous technology for sound disposal of these waste streams. Connect with educational institutions for R&D or chambers of commerce for presenting the international experience and expertise.</p>	<p>Benefits/examples:</p> <p>Effective management of WEEE could be beneficial in several ways:</p> <ul style="list-style-type: none"> • Conserve natural resources by recovering valuable materials from waste streams • Create new economic opportunities by providing a source of valuable materials • Reduce the environmental impact of waste disposal by diverting materials from landfills and incinerators • Reduce a country's reliance on imports of raw materials by providing a local source of valuable materials • Create new jobs in the recycling and manufacturing industries and expand additional recycling potential in the country

12. Regular workshops (Awareness raising/Refresher)

<p>Lessons and examples from Moldova:</p> <p>Regular workshops on EIP and its different indicators, as well as on RECP and IS (involving tenant firms) would ensure that the momentum is continued. Due to the pandemic, a handful of workshops were carried out online. However, the physical interactions and offline training led to a much higher retention and adoption rate of the proposed RECP and IS recommendations.</p>	<p>Relevance in the EIP context:</p> <p>Training and workshops are a core function of EIP implementation, teaching and reinforcing knowledge, while simultaneously ensuring worker and other stakeholder participation.</p>
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<p>Replication opportunities in EaP countries:</p> <p>IP administration: run regular workshops in an interactive format to refresh the discussion and include any new IS or RECP opportunities on an ongoing basis, within a continuous assessment of the ongoing sustainability opportunities (or an implemented EIP framework).</p> <p>Educational institutions: local educational institutions (e.g., universities) could be trained to deliver these regular workshops. This would also create opportunities for long-term employment and promote sustainability in the foundational years of various university programmes.</p>	<p>Benefits/examples:</p> <p>Ongoing engagement on RECP and industrial symbiosis as well as other environmental and social activities on industrial parks results in:</p> <ul style="list-style-type: none"> • Regular sharing of data, along with new information, tools, and techniques • Pro-active involvement of all involved stakeholders • Regular updates to the EIP progression plan
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13. Extracting existing RECP and IS initiatives

<p>Lessons and examples from Moldova:</p> <p>Rapid RECP and IS assessments at both IPs revealed that many previously unidentified opportunities on RECP and IS were already in place (e.g., shared procurement or use of resources).</p>	<p>Relevance in the EIP context:</p> <p>RECP and industrial symbiosis are core, critical, and foundational elements of an EIP framework, as they promote good environmental practices and synergies of companies (based in a cluster or in similar set-ups) to amplify environmental gains.</p>
<p>Replication opportunities in EaP countries:</p> <p>IP administration:</p> <p>Identify existing RECP and IS activities in the parks and zones with the help of experts and recommend improvements or modifications, if required. Promote benefits and the need for increased collaboration between companies.</p> <p>Tenant companies: Identify good practices which are already in place for various environmental aspects (such as waste, energy, water, air emissions, renewable energy, biodiversity, green spaces, procurement, etc.). This includes joint activities in place with other neighbouring companies or communities that help reduce their environmental impact. Register and record these activities, and build on them using external experts, where necessary.</p>	<p>Benefits/examples:</p> <p>Rapid RECP assessments at IP Tracom and FEZ Valkaneş already demonstrated that some RECP and IS opportunities were undertaken by tenant firms without the prior involvement of experts:</p> <ul style="list-style-type: none"> • Securing common suppliers for cardboard • By-product waste utilization (e.g., waste aggregate for temporary road strengthening) <p>Building new RECP and IS networks and opportunities was easier due to pre-existing collaboration and trust between companies themselves, as well as with the IP administration.</p>

14. Prioritising the EIP needs

<p>Lessons and examples from Moldova:</p> <p>Each country or region would have different priority EIP requirements based on their location, local environment, access to water/sunlight, local regulations, weather, etc.</p>	<p>Relevance in the EIP context:</p> <p>The EIP framework provides guidelines which must be interpreted and fit into the local context. It is important that each region, depending on its local conditions, customises and prioritises its requirements to gain the optimum amount of benefits when implementing them.</p>
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<p>Replication opportunities in the EaP countries:</p> <p>Government: Priority actions to be identified and complemented with relevant legislation (e.g., water use, storage, and disposal in Moldova; e-waste handling and management), as well as the corresponding infrastructure (e.g., wastewater treatment systems or e-waste management facilities)</p> <p>IP Administration: Use the international EIP framework to prioritise the top 5-8 EIP actions on a short-, medium-, and long-term basis</p>	<p>Benefits/examples:</p> <p>Water shortage is an acute problem in Moldova and has been recorded as a top priority for enabling action in the region.</p>
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15. Access to finance

<p>Lessons and examples from Moldova:</p> <p>At an IP level, due to varying priorities, it is oftentimes difficult to set aside a large amount of funding for EIP actions. For example, FEZ Valkaneş has a strong inclination to move towards renewable energy sources, but the time and resources required (including financial) are significant and the FEZ cannot implement them without external funding.</p>	<p>Relevance in the EIP context:</p> <p>The EIP framework will require commitment in terms of focus, expertise, as well as finance to achieve the target indicators. Some of the actions, such as a common effluent treatment plan, waste management facilities, renewable energy, or emergency services could have significant environmental and social benefits but would require commitments from a wide range of stakeholders who would be direct or indirect beneficiaries. These include the IP administration, tenant companies, and the Government.</p> <p>Financing does not need to be for one or two specific EIP measures, but rather to help make IPs generally more financially stable and sustainable. Once that is accomplished, then the IPs themselves can continue reinvesting into their development, especially to become an EIP.</p>
<p>Replication opportunities in the EaP countries:</p> <p>Government:</p> <p>Allocate funding to facilitate environmental and social activities within industrial parks. Set up incentive schemes and/or other benefits that can motivate IPs and tenant companies to invest and to reduce the return on investment (ROI) times.</p> <p>IP administration:</p> <p>Identify sources of funding (including development banks, international finance corporations, etc.). Create a database of the relevant financing agencies. Identify sources of ESG funds that would finance such investments at practicable rates.</p>	<p>Benefits/examples:</p> <p>For advanced EIP nations (e.g., Viet Nam), detailed studies are undertaken, and documents are prepared for identifying financial mechanisms to support EIP activities and industrial synergies at IPs. Through such financial support, several synergies (e.g., steam generation) have been financed.</p> <p>Romania and Hungary offer grants for construction – especially those focused on sustainability.</p> <p>IPs should consider EIP as a necessary business investment (not a separate activity unlinked to their transformation and development). Environmental and social improvements are an integral part of businesses and IP growth, and suitable financial investments should be made by stakeholders in the transition to an EIP.</p>

16. De-alienating IPs and FEZs (or similar zones)

<p>Lessons and examples from Moldova:</p> <p>The IPs and FEZs in Moldova believe that, as an independent zone focused on export, the focus of the Government has not been consistent and that most agencies and stakeholders are only reacting (when required). The future of FEZs is also currently unknown to the administration, creating a lack of stability and trust.</p>	<p>Relevance in the EIP context:</p> <p>Economic zones (SEZ, FEZs) are very important in the EIP context as they are mostly export oriented, enjoy a lot of tax benefits, and attract a myriad of investments. It is necessary to make them additionally attractive through relevant mechanisms such as EIP.</p>
<p>Replication opportunities in the EaP countries:</p> <p>Government: Create a regular, pro-active channel of communication with IP and FEZ administrations (or the associations representing these clusters) to understand their needs and challenges. Less focus should be placed on strategies, and more focus should be placed on investing in existing IPs and FEZs.</p>	<p>Benefits/examples:</p> <p>A new industrial platform has been introduced in Moldova during 2021-22 without a legal status or classification. This new platform is taking away attention from existing clusters, which require stakeholder support (including financial support).</p>

17. Educating and communicating sustainability and EIP

<p>Lessons and examples from Moldova:</p> <p>It is currently perceived that sustainability is preached and expected at an IP/FEZ level, but not yet communicated at a national level in Moldova.</p> <p>IPs believe that any new laws or regulations should be adequately communicated, along with corresponding infrastructure or facilities for meeting the new regulations. The concept of sustainability and EIP should also be promoted nationally to make this a widely accepted practice, rather than a one-off activity.</p>	<p>Relevance in the EIP context:</p> <p>An EIP framework requires widespread knowledge, understanding, and acceptance of its core principles.</p>
<p>Replication opportunities in the EaP countries:</p> <p>Government: The Government and lawmakers play a key role in designing an EIP policy. It is then up to them to adequately pilot such a policy to ensure its suitability and applicability, whilst simultaneously educating the affected recipients of its articles.</p>	<p>Benefits/examples:</p> <p>A well designed and communicated policy will make it easier for the stakeholders to understand and implement it.</p>

4.3. The EIP advancement plan for the EaP countries

Additional learnings with the potential for replication in other EaP countries are highlighted in the tables below.

To advance the EIP development in the EaP countries, it is proposed that the results of the comprehensive assessment of the technical, institutional, regulatory, and financial needs, as well as capacities and gaps (as identified in the project in Moldova) can be shaped into concrete and practical action plans. These can be achieved in Moldova first, and then translated (with insights and learnings from other countries) to build a set of selected actions required to operationalize national EIP frameworks in other EaP countries. The action plan includes the following:

- Key objectives/actions to achieve the desired EIP framework on the following topics (topics that are aligned with the EIP Practitioner's Handbook):
 - o Governance and stakeholder engagement
 - o Policy and regulations
 - o Technical aspects, monitoring, and evaluation
 - o Financial mechanisms
- Complementary tasks/activities to be conducted as part of each action item
- Responsible stakeholders to conduct the relevant activities
- A timeline/milestones
- Potential for replication across the EaP region
- Rationale and additional notes (where relevant)

The action plan laid out in the sections below lays the foundation and provides various integral inputs and steps towards building national EIP frameworks for EaP countries (based on the UNIDO international EIP framework). Based on the work undertaken in Moldova and the lessons learned there, they highlight the main steps to best engage the different, relevant stakeholders towards a collaborative development and the implementation of the EIP agenda. The tables below propose actions which may need to be adapted and/or modified to fit the national context.

4.3.1. Governance and stakeholder engagement

The design of a national policy framework requires the involvement of a broad set of stakeholders (from the public and private sectors to academia, and civil society). Therefore, when establishing the national EIP framework, practitioners are advised to identify and work with an effective advocate, such as the President's Office or Prime Minister's Office, which has the authority to bring key policymakers and the private sector to the table. Governance itself is the result of a participatory process of multiple stakeholders. Therefore, engagement is essential to govern.

Under this action plan, the first step will be the formation of an **EIP community of practice (CoP) for the EaP countries** – a macro-level, official governance entity, with a formal structure and defined roles and responsibilities, specifically for carrying out activities for the implementation of transformative EIP measures in the country. The CoP can be comprised of representatives from all key stakeholder groups, including: public and private entities, academic institutions, Government authorities (including central Ministries in areas like agriculture, regional development, environment, economy, infrastructure, finance, etc.) and other EIP implementation agencies. The CoP can also include the participants from the EIP capacity-building and awareness-raising programmes undertaken in Moldova as part of this project, and other peers from similar regional/national sessions in other EaP countries.

The CoP will act as a common platform for engagement amongst these groups and provide a mechanism for supporting the implementation of EIPs through actions including establishing relevant policies and regulations; governing structures and interventions; favourable financing mechanisms; as well as monitoring and evaluating the progress and outcome of these steps.

**Table 1 Action plan for stakeholder engagement and governance –
Objectives and milestones for EIP transformation in the EaP region (developed for Moldova and
highlighting replication potential across other EaP countries)**

Objective	Tasks	Potential for replication across the EaP region (potential and specific actions)	Expected outcome	Milestone			Responsible stakeholder(s)
				2023-24	2025-26	2027-31	
Establishment of an EIP community of practice (CoP) , with a defined governance structure dedicated to the formation of the EIP framework (adapted to the national context) by supporting and igniting new alliances amongst EIP implementation agencies such as IP initiators, management businesses, and other participants from different institutions and regions	<ul style="list-style-type: none"> Engage stakeholders in concrete actions through working group sessions on priority topics: capacity-building, policies, and incentives, monitoring, and communication Hold discussions on identifying appropriate personnel and defining a clear leadership and governance structure for the implementation of a national EIP framework Identify and address gaps towards supporting agencies in implementing the framework 	<ul style="list-style-type: none"> Identify key stakeholders in each region Specify roles, responsibilities, and the decision-making hierarchy (i.e., ownership and overall responsibilities; operational and/or functional leads; experts (national and international); etc.) Create formal communication channels for the relevant stakeholders and experts (e.g., creation of clubs, online forums, or similar platforms for knowledge exchanges and resource sharing) 	Establishment of a central executive body, namely the CoP, supported by competent agencies, to carry out state policies on the planning, establishment, and operation of EIPs in Moldova (and other regions)				Ministry of Agriculture, Regional Development and Environment (or similar institutions with relevant roles)

Objective	Tasks	Potential for replication across the EaP region (potential and specific actions)	Expected outcome	Milestone			Responsible stakeholder(s)
				2023-24	2025-26	2027-31	
Development and execution of government-sponsored programmes to assist in the formation and implementation of EIPs by building a skilled workforce, equipped with creating and addressing issues relevant to EIPs	<ul style="list-style-type: none"> Identify gaps/challenges faced by EIP implementation agencies arising from the lack of a trained workforce Create a state-sponsored programme, complete with applied research programmes on the design and operation of IPs, aimed at equipping the working age population with the relevant skills required to transform an IP into an EIP Promote collaboration between businesses, academia, and the Government to further tailor the programmes to the needs of the IPs 	<ul style="list-style-type: none"> Training and capacity-building of the relevant experts to roll out EIP, RECP, and Circular Economy Ensuring other stakeholders (IP administration, tenant companies, etc.) are well-trained and coached During 2023-24, use international experts to train the local national team Capacity-building and awareness at decision-making (policy, governance) levels Creation of relevant tools, dashboards, and materials for long-term capacity-building programmes Exploring potential links with local universities and educational institutions such as knowledge hubs (also providing training, as well as linking university or institution-linked credits like work-based learning) 	Business enterprises in the IPs supplied with qualified, competent individuals through collaborations with vocational training centres, universities, and other educational institutions				<p>Ministry of Agriculture, Regional Development and Environment and Ministry of Economy and Infrastructure.</p> <p>Support from private sector organizations, academic institutes, and national and international financial institutions</p>

Objective	Tasks	Potential for replication across the EaP region (potential and specific actions)	Expected outcome	Milestone			Responsible stakeholder(s)
				2023-24	2025-26	2027-31	
<p>Creation of strategic inter-company committees, and/or local associations with representatives from all key stakeholders. These will provide centralized contact points for IPs and other stakeholders, focusing on addressing the needs of the businesses and on providing solutions</p>	<ul style="list-style-type: none"> Hold discussions to identify the key stakeholder groups who should be included in the formation of the committees/associations 	<ul style="list-style-type: none"> Identifying the most relevant industry associations, chambers of commerce, clubs, or any such networks that have representation from various stakeholders to voice their needs for sustainable business growth (including environmental, social, and economic development) and park improvement This association could be the 'operational hub', as well as the 'knowledge centre' for the IP 	<p>An established system of competent agencies at the local level, supported by the legal framework, responsible for monitoring, evaluating, and addressing IP needs</p>				<p>IP & FTZ management boards & tenant firms</p>

Objective	Tasks	Potential for replication across the EaP region (potential and specific actions)	Expected outcome	Milestone			Responsible stakeholder(s)
				2023-24	2025-26	2027-31	
Establish a national information platform for knowledge-sharing on EIPs (and/or sustainability), posting proposals/callouts for proposals, organizing events, planning workshops, etc.	<ul style="list-style-type: none"> Design an information-sharing platform, in the form of a webpage, with clearly defined final users (content and form) integrated into the design of the platform The platform will document valuable resources and examples (such as useful international case studies, qualitative studies, feedback from firms, assessments, etc.) on the benefits derived from EIPs which can help demonstrate the potential of EIPs and set up the basis for policymakers to establish new mechanisms 	<ul style="list-style-type: none"> Identify the most suitable and relevant platform for sharing information which could be in the form of an app, a webpage, or an online tool This could be an existing website with a dedicated webpage with relevant information on EIP, as well as case studies and tools The platform could also be a hub for sharing relevant resource efficiency/industrial symbiosis opportunities in the region as well as promote new proposals, events, workshops or any other such announcements (a one-stop shop for EIP, RECP, industrial symbiosis and Circular Economy) 	A common platform developed to create stronger linkages between governments, companies, and other key agencies, and to promote awareness amongst companies on the policies/tools available to them and their respective benefits				EIP CoP supported by UNIDO
	<ul style="list-style-type: none"> The knowledge-sharing platform can also be used by individual IPs to identify, develop, and implement feasible EIP initiatives and promote overall networking and capacity development amongst their tenant firms 	<ul style="list-style-type: none"> Customised or readily available tools (including those listed in this guide) could be added on such a platform to identify EIP opportunities and propose and support the implementation of relevant corresponding solutions 	Provision of information/avenues on EIP and sustainability-related knowledge for IPs to develop and grow				

Objective	Tasks	Potential for replication across the EaP region (potential and specific actions)	Expected outcome	Milestone			Responsible stakeholder(s)
				2023-24	2025-26	2027-31	
Setting up training and capacity-building sessions on EIP implementation	<ul style="list-style-type: none"> Set up periodic online and onsite training programmes at regional, IP, and company levels to build awareness about the platform and promote overall capacity development on EIPs 	<ul style="list-style-type: none"> Such capacity-building programmes will be ongoing over the next several years, becoming increasingly detailed and advanced to ensure that the national experts have the knowledge and understanding at a global level and are on par with international experts Training could be in the form of 1:1 sessions (in person or online), long-term certificate-based training programmes, masterclasses, work-based learning, credit-linked trainings, etc. This could be adapted to the needs of the region, as well as the inclination of relevant stakeholders in the region 	Higher understanding of sustainability and EIPs for key members within each IP, as well as other stakeholders				EIP CoP, The Government, experts

4.3.2 Policy and regulation

The national regulatory context has a crucial role in enabling the appropriate conditions to support planning, development, and the implementation of EIPs and all related practices. Therefore, the national EIP framework should include recommendations to support policy development and implementation towards an ideal system which embraces the actual needs, challenges, and opportunities of the IPs.

Table 2 Action plan for policy and regulation – Objectives and milestones for EIP transformation in the EaP region (developed for Moldova and highlighting replication potential across other EaP countries)

Objective	Tasks	Potential for replication across the EaP region (potential specific actions)	Expected outcome	Milestone			Responsible stakeholder
				2023-24	2025-26	2027-31	
Integration of EIP development into the current policy landscape to promote the creation and operation of EIPs	<ul style="list-style-type: none"> Review and deep dive into the legal documents and policies pertaining to IP/FEZ management Explore the scope of integrating the EIP concept into the existing policies (including potential regulatory barriers or gaps which can be addressed either via amendments to the existing policies or by developing standalone, targeted policies which will promote the practical implementation of EIPs) Engage with key stakeholders from industry and academia to understand their experiences in implementing cleaner production interventions or adopting symbiotic industrial models Develop proposals to modify the existing regulatory framework or development of new policies for the creation of EIPs 	<ul style="list-style-type: none"> Identify existing regulations relevant to a) environment/sustainability, b) industrial development, and c) IPs Explore integrating EIP principles within existing regulations, directives, policies, decrees, etc. This would include <ul style="list-style-type: none"> Amending and improving IP infrastructure Improving environmental sustainability Integrating social wellness Improving the economic performance of IPs Identify gaps in policy and regulation, especially pertaining to waste management, hazardous and toxic waste, wastewater discharge and treatment, climate change, energy and resource efficiency, worker welfare, equality, and community involvement. Develop and propose new policies to create EIPs 	Concrete legislation with strategies to create and operate EIPs, including addressing topics such as adopting EIPs as a component of the state building laws; state incentives (such as funds, tax incentives, direct investments, etc.) for developing and operating EIPs (including the conversion of existing IPs into EIPs); availability of subsidized resources for developing and operating EIPs (materials, energy, water, etc.); and a mechanism for monitoring and ensuring general compliance of EIPs with the requirements of the regulations				Ministry of Agriculture, Regional Development and Environment, Ministry of Economy and Infrastructure, along with support from national and regional Government officials, private sector organizations, academia, and UNIDO

Objective	Tasks	Potential for replication across the EaP region (potential specific actions)	Expected outcome	Milestone			Responsible stakeholder
				2023-24	2025-26	2027-31	
Creating budget plans at the state and local levels for incentivizing IP members' economic activities	<ul style="list-style-type: none"> Form short- and long-term state and local support programmes for IP participants Define the criteria and circumstances under which the budgetary resources can be used by the IPs 	<ul style="list-style-type: none"> Government can provide tax breaks and/or other financial incentives to industrial parks and tenant companies therein that adopt eco-friendly practices to become an EIP. Examples could include tax credits for using renewable energy sources or for reducing GHG emissions; incentives for a shared use of resources (e.g., transportation) Design an incentivisation plan that clearly lists the beneficiaries and the conditions for receiving an incentive, and hold the receiver responsible for producing the results 	An established system of state assistance available to IP stakeholders, disbursed via local municipalities				Ministry of Agriculture, Regional Development and Environment, Ministry of Finance, along with the support from national and regional authorities.
Developing or adapting (based on the existing guidelines) EIP technical guidance documents and handbooks for companies and park managers	<ul style="list-style-type: none"> Research and review guidelines and handbooks from countries where EIPs have been successfully implemented Create an EIP technical guideline based on the outcomes and observations from the assessments carried out as part of this project, as well as successful practices from other countries for creating more resource-efficient and cost-effective IPs Prepare and circulate a draft of the guideline with comments from key stakeholders Disseminate the final guideline amongst the authorities, companies, and park managers 	<ul style="list-style-type: none"> Use the international framework for EIPs as a baseline reference Combine lessons from local regions (e.g., Moldova, Ukraine) and compare them with the experiences in other emerging economies (e.g., Viet Nam, South Africa, Peru, Egypt) to create a technical guide on EIPs for IP administration, tenant companies, as well as local and national government bodies Ensure this guide is suitable for the national context 	A national technical guideline for implementing EIPs is adopted (with comments and recommendations from authorities and the private sector)				Ministry of Agriculture, Regional Development and Environment, supported by the EIP CoP

Objective	Tasks	Potential for replication across the EaP region (potential specific actions)	Expected outcome	Milestone			Responsible stakeholder
				2023-24	2025-26	2027-31	
Incorporating topics related to EIPs as part of the curriculum of educational institutions to promote awareness and capacity-building on EIPs	<ul style="list-style-type: none"> Add subjects such as EIP development, industrial symbiosis, resource efficiency, cleaner production, etc. to higher educational institutes' syllabi 	<ul style="list-style-type: none"> Integrate environmental sustainability well into education at different levels Tailor the topic for students learning industrial management, engineering, or sustainability, to create a knowledge-base on EIPs 	Curriculum in schools and universities incorporating sustainability, linking it to industrial growth, industrial parks, and to EIP principles				Ministry of Education and Research, supported by academic institutions

4.3.3. Technical aspects, monitoring, and evaluation

The success of a national EIP programme lies across various stakeholders and roles. However, one key aspect to ensure its success is the robustness of the technical know-how needed for its planning, development, and establishment. This should be followed by technical requirements on proper mechanisms, training, and capacity-building for monitoring, reporting, and evaluation. Therefore, the national EIP framework should include recommendations and benchmarks to support the technical development and implementation of an ideal system which addresses the actual needs, challenges, and opportunities identified in the technical analysis.

Table 3 Action plan for technical aspects, monitoring, and evaluation – Objectives and milestones for EIP transformation in the EaP region (developed for Moldova and highlighting replication potential across other EaP countries)

Objective	Tasks	Potential for replication across the EaP region (specific actions)	Expected outcome	Milestone			Responsible stakeholder
				2023-24	2025-26	2027-31	
Adaptation of international frameworks for developing EIPs (particularly the framework developed collaboratively by UNIDO, the World Bank, and GiZ)	<ul style="list-style-type: none"> • Undertake a baseline EIP assessment study to review the current performance of the companies and identify potential areas of intervention and/or adaptation for developing or transforming an IP into an EIP • Analyse the outcome from the assessment and suggest initiatives for applying the identified EIP opportunities, taking into account inputs from the technical guideline • The initiatives can include the following: <ul style="list-style-type: none"> o Developing a ‘code of conduct’ which promotes adoption of Circular Economy principles, including waste reduction, reuse, recycling, as well as opportunities for energy reduction The code can also specify obligations of all tenant firms on responsible environmental performance (such as waste management, air pollution management, etc.) and consequent penalties in case of non-compliance o Data collection on key operational parameters of all tenant companies along with their inefficiencies and needs o Training tenant firms on the benefits of relying on low/no investments in their operations, supplementing good housekeeping, maintenance, and the role of employees in becoming more resource efficient o Mapping the entire IP and creating a list of potential IS opportunities o Regularly deploying satisfaction surveys to tenant companies to get feedback and identify follow-up actions • The assessment can pay greater attention to the IPs’ social performance as well and identify ways to improve the local community (e.g., through urban-industrial synergies, job creation, etc.) 	<ul style="list-style-type: none"> • Adapt the international EIP framework to the national context (using experiences from other regions, international experts, local/national IP experts, EIP/ RECP/ industrial symbiosis, Circular Economy experts, and policymakers) 	EIP framework, or an adaptation of it, suitable for the region that incorporates international standards and national priorities and conditions, based on a common understanding of EIPs and a standardized set of indicators and technical requirements which need to be met				EIP CoP, supported by UNIDO and other technical agencies

Objective	Tasks	Potential for replication across the EaP region (specific actions)	Expected outcome	Milestone			Responsible stakeholder
				2023-24	2025-26	2027-31	
Undertake EIP pilot project interventions to identify successes and areas for improvement	<ul style="list-style-type: none"> Develop proposals for pilot projects to establish EIPs Shortlist and select potential IPs/FEZs which can transition to EIPs Plan and allocate budgets for the pilot project Implement the project in the selected IP and periodically evaluate progress over time 	<ul style="list-style-type: none"> Using existing UNIDO tools, create a list of all industrial clusters and zones in the region, and through a prioritisation matrix, identify and shortlist the most suitable IPs and FEZs Invite these IPs to participate in a journey to become EIPs, providing them with the knowledge, infrastructure, policy baseline, as well as relevant experts to implement this transition 	<ul style="list-style-type: none"> List of potential IPs/FEZs which can be transformed into EIPs Report on the transformation process and success of the EIP model 				EIP CoP, supported by the Ministry of Agriculture, Regional Development and Environment, and UNIDO
Strengthen the EIP assessment and development process for nationwide implementation	<ul style="list-style-type: none"> Develop a benchmarking system to evaluate adherence of various EIPs to a pre-defined, standardized EIP model Constant evaluation of ongoing EIP transformations, state and local programmes, and other resources and tools available to the IPs to improve The EIP CoP should be responsible for regularly monitoring the EIP implementation/transformation process and periodically report on the progress to the central Government. 	<ul style="list-style-type: none"> Regular review and course correction of the EIP journey of the selected IPs Ongoing review of the available resources and tools, as well as the effectiveness of the policies Regular monitoring of the benefits of (or barriers to) EIP implementation in a pre-set format. 	<ul style="list-style-type: none"> Regular reports on the ongoing nationwide implementation process 				EIP CoP, supported by the Ministry of Agriculture, Regional Development and Environment, and UNIDO

4.3.4. Financing mechanisms

To establish recommendations and an action plan to integrate a national EIP framework supported by financial mechanisms, it is important to consider three units of analysis that need to generate their own financial opportunities and economic benefits. Firstly, the companies within the EIPs, secondly, the EIPs as a whole, and thirdly, the framework that supports the two.

Table 4 Action plan for financing mechanisms – Objectives and milestones for EIP transformation in EaP region. Developed for Moldova and highlighting replication potential across other EaP countries.

Objective	Tasks	Potential for replication across the EaP region (specific actions)	Expected outcome	Milestone			Responsible stakeholder
				2023-24	2025-26	2027-31	
Providing financial autonomy to tenant companies and park management to transform their IP into the EIP	<ul style="list-style-type: none"> Map the existing financial mechanisms available to tenant companies to implement specific sustainability and EIP initiatives Document the current financial and non-financial incentives available to parks and their firms and promote their knowledge and benefits amongst the businesses and park authorities Train the IPs and their firms on these incentives, via on- and off-site sessions 	<ul style="list-style-type: none"> Identify the sustainability requirements and corresponding financial needs of the IPs and resident tenant companies Map these requirements against the available financial mechanisms (this document must be updated on a regular basis). Ensure that suitable support is available to the applicants to avail these financial schemes 	Park management and IP initiators making use of the financial and non-financial incentives made available by the state.				UNIDO, supported by EIP CoP
Promoting Moldovan EIP models at international forums, conferences, bilateral events, etc.	<ul style="list-style-type: none"> Ensure that representatives from Moldova’s IPs attend international events and showcase the potential of the existing parks and their investment potential 	<ul style="list-style-type: none"> Using the experiences from Moldova and Ukraine, create a customised national plan that is relevant to the region, including policies, infrastructure, technologies, and inviting investments aiming to create sustainable IPs 	Potential international investors and other international stakeholders closely examining the Moldovan IP model and evaluating possible future investments				Ministry of Economy and Infrastructure

Objective	Tasks	Potential for replication across the EaP region (specific actions)	Expected outcome	Milestone			Responsible stakeholder
				2023-24	2025-26	2027-31	
Negotiating with international partners to encourage investments for green initiatives within the EIP framework	<ul style="list-style-type: none"> Build comprehensive narratives and proposals on the benefits derived from the IPs Use these proposals to undertake suitable negotiations with international partners and investment funds to attract investments in EIPs which meet the established criteria 	<ul style="list-style-type: none"> Consider sources of financing and funding using a Circular Economy narrative and highlight green businesses as a means to attract investment and create jobs Work with development co-operation agencies to run pilot projects, with a plan to run these (financially and functionally) independently in due course Using the ESG (environment, social governance) model, which reflects the EIP framework, attract more interest for local industries and IPs 	Investment funds (and other funds from international partners) are made available for developing EIPs				Ministry of Finance of Moldova
Exploring new opportunities and financial mechanisms to promote EIPs	<ul style="list-style-type: none"> Investigate new types of financial mechanisms which target EIP projects/processes (such as industrial and urban symbiosis and cleaner production), along with other Circular Economy-based projects 	<ul style="list-style-type: none"> Bank on supply chain synergies – attract EU-based and other types of investments by demonstrating cleaner and greener supply chains and by potentially meeting various EU green directives and policies 	The creation of a database (constantly updated), listing possible financial sources and mechanisms for supporting EIP and related activities (applicable to each region)				Ministry of Economy and Infrastructure, supported by financial institutions and the EIP CoP

4. Conclusions & recommendations

EIPs are gaining traction and recognition globally thanks to their aim of bringing together industries, businesses, governments, academia, and other key players and service providers. This trend is also visible in the adoption of the EIP concept in the EaP countries. The objective of this guide is to present the learnings, key observations, and the action items that the project team has identified, using examples from the field work conducted in the Republic of Moldova which can be potentially replicated in other EaP countries (assisting them in developing national EIPs). As one of the main goals of UNIDO via the GEIPP programme is to promote the development and upscaling of EIPs, the guide also details the action items for developing a national EIP framework and incorporating this framework into the country's development planning. For achieving a fully formed EIP, the vision and implementation plan needs to be more comprehensive, as is detailed in Chapter 4 of this report. An overview of the observations and learnings from Moldova and their potential for replication are presented in the table below.

Lessons and examples from Moldova	Potential for replication in other EaP countries
A sustainability model at the core of IPs	
The experiences of IP Tracom strongly suggest incorporating sustainability and Circular Economy into EIPs	This is possible with the involvement of the Government to develop new policies focused on sustainability at an IP-level, and by the IPs themselves (by internally embracing circularity and sustainability concepts)
Localising the international framework	
Contextualising and tailoring the EIP indicators to the national context of Moldova is required since in their current format, many of the EIP indicators are not applicable to the IPs in Moldova	Every EaP country needs to adapt the international EIP framework to suit its national context
The law of the land	
A lack of specific regulations pertaining to environmental and social performance of industrial operations provide a precarious foundation for promoting EIPs in Moldova, as EIPs require a stringent legal framework	The involvement of the governments in all of the EaP countries is crucial for establishing a regulatory framework, based on the key concepts of EIPs and/or sustainability aspects for guiding the EIP development
Starting with a master plan	
There is a lack of existing master plans for retrofitting IPs to transform them into EIPs	The industrial park administration (with the help of experts) will need to develop a master plan for greenfield and brownfield IPs, to optimise the different sectors present within the existing IPs
Ownership	
Different ownership and administrative structures in Moldova led to ambiguity in the implementation of various EIP and sustainability indicators	The Government/relevant Ministries need to clearly define and demarcate the roles and responsibilities of the IP administration and the authorities (particularly pertaining to the creation of EIPs)

Contracts and agreements	
Only a portion of the tenant companies in the pilot IP in Moldova had contracts with the administration (while the others were sub-let tenants, meaning they had no formal obligation to the IP)	The IP administration needs to ensure legally binding contracts with all the tenant companies, clearly defining their obligations and responsibilities towards the IP
Engaging tenants	
There is a lack of engagement between the IP administration and the tenants, leading to a lack of transparency	It is the responsibility of the IP administration to drive strong engagement and networking amongst the tenants through various channels, including contracts, codes of conduct, regular meetings, community newsletters, etc.
Complex tax structures	
The tax structure followed in IP Tracom is complicated, with three types of taxes being levied on the tenants (a bureaucratic and financial hurdle for the companies)	The Government should be responsible for establishing a simple tax regime, which will assist in improving transparency and trust amongst the tenant companies and the park administration
Energy costs and stability	
The recent war and the pandemic have led to a sharp increase in energy and gas prices across Moldova, re-emphasizing the need of firms to have higher resilience to various risks which can impact their businesses	The Governments, along with the IP administrations, will need to create a roadmap which will account for and address the various risks which can impact industry operations, including identifying mitigation and countermeasures
Making IPs an attractive source of investment	
The 'Law of IPs in Moldova' was introduced by the Moldovan Government to enhance the appeal for establishing EIPs in Moldova	The governments will need to amend and adapt the existing regulatory framework to position IPs in a favourable light, making them an appealing business destination
Urban mining	
There are no facilities which dismantle and separate the downstream WEEE and provide a good solution for disposing of this waste stream	The key stakeholders for introducing and replicating relevant policies for this issue should be the Governments, investors, and educational institutions. They will be responsible for implementing such waste streams, developing indigenous technology for sound disposal of WEEE, and for drawing insights from international experiences and expertise
Regular workshops	
Workshops on EIPs and its different concepts need to be regularly conducted, involving all tenant firms and the park administrations	The IP administration will be responsible for conducting regular workshops on EIPs, along with any new IS, RECP, or sustainability opportunities
Extracting existing RECP and IS initiatives	
The RECP and IS assessments brought to light several (previously unidentified) opportunities which can be acted upon	The IP administration and the tenant companies need to identify existing RECP and IS opportunities, good practices (with the help of experts), and to build on them

Prioritising the EIP needs	
It is imperative to identify the key EIP requirements for each country, based on the regional factors, as each country will have different priorities	It is the responsibility of the Government to identify and establish the actions that complement the existing legislation, while the IP administration should focus on prioritising the top 5-8 actions based on the EIP framework, (which can be implemented over the short- to long-term)
Accessing finance	
At the IP level, it is difficult to finance large funds towards EIPs	The governments and IP administrators need to identify sources of funding (including from development banks, international finance corporations, and other relevant financing agencies). It will also be the governments' responsibility to set up incentive schemes and other benefits for allocating these funds
De-alienated IPs and FEZs (or similar zones)	
When it comes to export, there is a lack of stability and trust amongst the IPs and FEZs, and the Government	The governments will need to create a proper channel with the IP and FEZ administrations, with more focus on the investments into the existing IPs and FEZs
Educating and communicating sustainability and EIPs	
Sustainability is not currently communicated at a national level in Moldova. This prevents EIPs from becoming a widely accepted practice	The governments and lawmakers play a key role in educating the key stakeholders across the countries on the relevant policies and resources available for promoting EIPs and sustainability within countries

Furthermore, the summary action plan below lays the foundation and provides various integral inputs and steps towards building a national EIP framework for EaP countries (based on the UNIDO international EIP framework).

The action plan includes the key objectives/actions to achieve the desired EIP framework; complementary tasks/activities to be conducted as part of each action item; responsible stakeholders to conduct the relevant activities; expected outcomes; timeline/milestones; potential for replication across the EaP region; and rationale.

A summary of objectives and expected outcomes is provided here:

1. Governance and Stakeholder Engagement				
Objective	Expected outcome(s)	Timeline		
		<2 years	2-3 years	>4 years
Establishing an EIP community of practice (CoP) with a defined governance structure, dedicated to the formation of the EIP framework	CoP established (supported by competent agencies) to carry out state policies on the planning, establishment, and operation of EIPs in various regions			
Development and execution of government-sponsored programmes to assist in the formation and implementation of EIPs by building a skilled workforce, equipped with the ability to address issues relevant to EIPs	Business enterprises in the IPs are supplied with qualified, competent individuals through collaborations with vocational training centres, universities, and other educational institutions			
Creation of strategic, inter-company committees and/or local associations, with representatives from all key stakeholders. These will provide centralized contact points for IPs and other stakeholders (focused on addressing needs and providing solutions)	An established system of competent agencies at the local level, supported by the legal framework, responsible for monitoring, evaluating, and addressing IP needs			
Establish a national information platform for knowledge-sharing on EIPs (and/or sustainability), posting proposals/calls for proposals, organizing events, planning workshops, etc.	A common platform is developed to create stronger linkages between governments, companies, and other key agencies, and to promote awareness amongst companies on the available policies/tools and their benefits			
Setting up training and capacity-building sessions on EIP implementation	Greater understanding of sustainability and EIP concepts for key members within each IP, alongside other stakeholders			

2. Policies and Regulations				
Objective	Expected outcome(s)	Timeline		
		<2 years	2-3 years	>4 years
Integration of the EIP development plans into the current policy landscape to promote creation and operation of EIPs	Concrete legislation with strategies to create and operate EIPs, including addressing topics such as: adopting EIPs as a component of the state building laws; state incentives (such as funds, tax incentives, direct investments, etc.) for developing and operating EIPs (including conversion of existing IPs into EIPs); availability of subsidized resources for developing and operating EIPs (materials, energy, water, etc.); and a mechanism for monitoring and ensuring the general compliance of EIPs with the requirements of the regulations			
Creation of budget plans at the state and local levels to incentivise the economic activities of IP managers	An established system of state assistance available to IP stakeholders, distributed via local municipalities			
Development of adapted EIP technical guidance documents (from existing guidelines) and handbooks for companies and park managers	Adopting a national technical guideline for implementing EIPs (with comments and recommendations from authorities and the private sector)			
Incorporation of topics related to EIPs as part of the curriculum of educational institutions to promote EIP awareness and capacity-building	Curriculum in schools and universities incorporating sustainability, linking it to industrial growth, industrial parks, and EIP principles			

3. Technical Aspects, Monitoring, and Evaluation				
Objective	Expected outcome(s)	Timeline		
		<2 years	2-3 years	>4 years
Adaptation of international frameworks to develop EIPs	The EIP framework (or an adaptation of it) is made suitable for the region and incorporates international standards, as well as national priorities and conditions. This is based on a common understanding of EIPs and a standardized set of indicators and technical requirements			
Undertake EIP pilot project interventions to identify success stories and areas for improvement	List potential IPs/FEZs which can be transformed into EIPs, and report on the transformation process and success of the EIP model			
Strengthen the EIP assessment and development process for nationwide implementation	Regular reports on the ongoing nationwide implementation process			

4. Financing Mechanisms				
Objective	Expected outcome(s)	Timeline		
		<2 years	2-3 years	>4 years
Providing financial autonomy to tenant companies and the park management to transform their IP into an EIP	Park management and IP initiators making use of the financial and non-financial incentives made by the state			
Promoting Moldovan EIP models at international forums, conferences, bilateral events , etc.	Potential international investors and other international stakeholders closely examining the Moldovan IP model and evaluating possible future investments			
Negotiating with international partners to encourage investments for green initiatives in the EIP framework	Investment funds and funds from international partners for developing EIPs are made available			
Exploring new opportunities and financial mechanisms to promote EIPs	A database (constantly updated) is created, listing possible financial sources and mechanisms for supporting EIP and other related activities (applicable to each region)			

The above recommendations for replicating the process of transforming IPs to EIPs and this overarching advancement guide are based on the lessons learned from undertaking the EIP pre-feasibility assessments in two industrial regions in Moldova. Whilst the lessons from Moldova serve as an excellent baseline for new IPs (and stakeholders) who are considering a transition to an EIP, it is important to note that the recommendations need to be aligned and adapted to the specific needs and context of each country, industrial cluster, and tenant companies. The above recommendations could be considered as a broad roadmap for EIP development in similar regions, particularly in the EaP countries.

For more information, please contact UNIDO and/or the authors of this report.

ANNEX 1

INTERNATIONAL CASE STUDIES:

Eco-Industrial Parks driving competitiveness and differentiation

1.1. Introduction

The section below summarises international case studies that successfully implemented the Eco-Industrial Parks Strategy. These case studies highlight the overall benefits and can be reviewed by Eco-Industrial Park (EIP) practitioners in the European Union's Eastern Partnership (EaP) countries as examples of **best practices** and as **potential opportunities for replication**.

The case studies have been presented country-wise with further categorization in terms of early adopters of the concept of EIP, GEIPP countries, and developing economies. In addition, each case study has also been highlighted to showcase the following components and aspects of the EIP Framework:

- EIP
 - o Park management
 - o Environment
 - o Economic
 - o Social
- Resource Efficient and Cleaner Production (RECP)
- Industrial symbiosis (IS)
- Urban-industrial symbiosis

List of case studies present in this document:

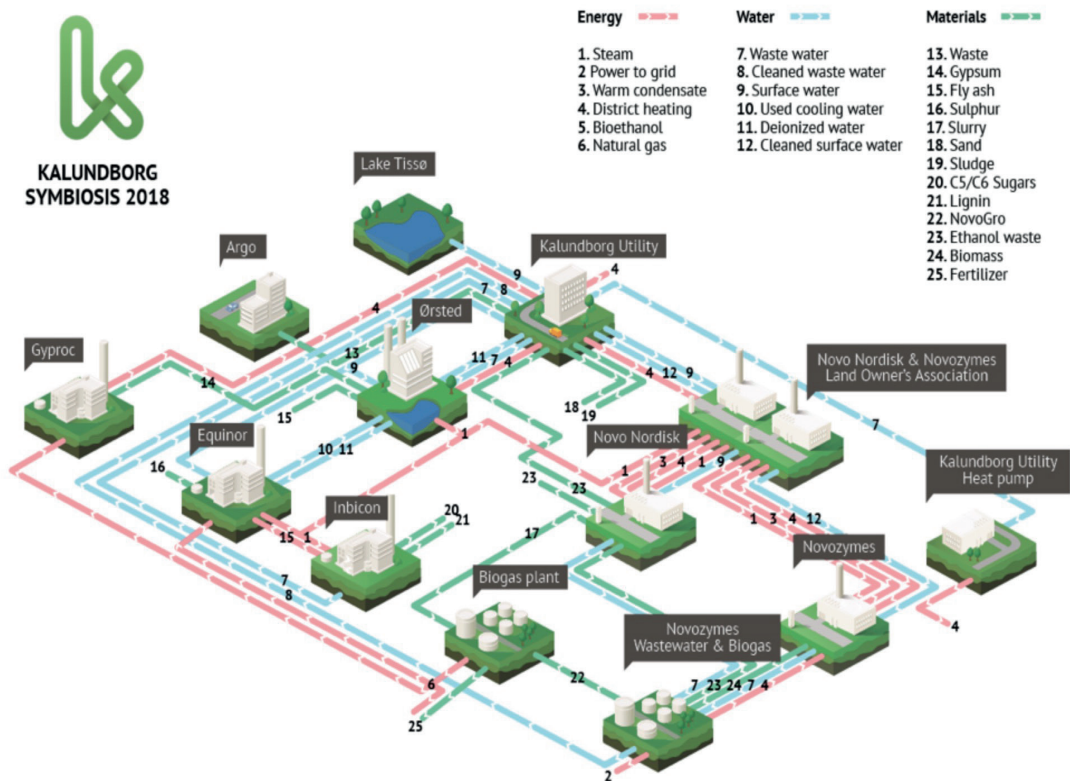
Case study name	
1	Kalundborg Industrial Symbiosis, Denmark
2	The EIP initiative in South Korea
3	The London Sustainable Industries Park, United Kingdom
4	PIMSA (Industrial Park Malambo), Barranquilla, Colombia
5	The sustainable industrial zones in Viet Nam
6	The East London Industrial Development Zone (ELIDZ) in South Africa
7	Awareness-raising activities in China and Viet Nam
8	Status quo assessment and EIP scoping interventions in India
9	The EIP feasibility assessment in Nigeria

1.2. Case studies from early adopter countries of EIP

1.2.1. Kalundborg Industrial Symbiosis, Denmark

Kalundborg Industrial Symbiosis³⁹ - IS

Overview: In Kalundborg, the city's largest industrial companies work together across different sectors and share their surplus energy, water, and materials with each other (one company's surplus product providing value for another). Public and private companies are physically connected in the symbiosis and together, they generate profits.



39 <http://www.symbiosis.dk/en/>



Important considerations:

Kalundborg Symbiosis is a partnership between nine public and private companies in Kalundborg, Denmark. Since 1972, they achieved and maintained the world's first industrial symbiosis with a circular approach to production.

The main principle is that a residue from one company becomes a resource at another, benefiting both the environment and the economy.

Such symbiosis creates growth in the local area and supports the companies' CSR and climate change mitigation efforts. The partners of Kalundborg Symbiosis have worked together since the 1960's, resulting in a collaborative approach and openness to new symbiosis opportunities.

Achieved benefits:

- The consumption of coal was reduced by 55,000 tonnes, and water, by 3 million m³ due to an exchange of 95% of the resources. This helped reduce collective emissions by 240,000 tonnes of CO₂ and approximately 68,000 tonnes of SO₂.
- With an initial investment of \$78.5 million between 1979 and 1993, the EIP was able to generate revenues of \$12 million a year (securing an average payback period of 5 years).
- Due to a fluid exchange of resources, the EIP can save approximately \$96 million a year.

Lessons learnt:

- Awareness, willingness, and feasibility among the companies in a cluster enables long-term industrial symbiosis.
- IS exemplifies the power of innovation and fosters trust among communities.
- Sustainability, growth, and profit can all be achieved through symbiosis.

The major steps involved in achieving industrial symbiosis⁴⁰ are to:

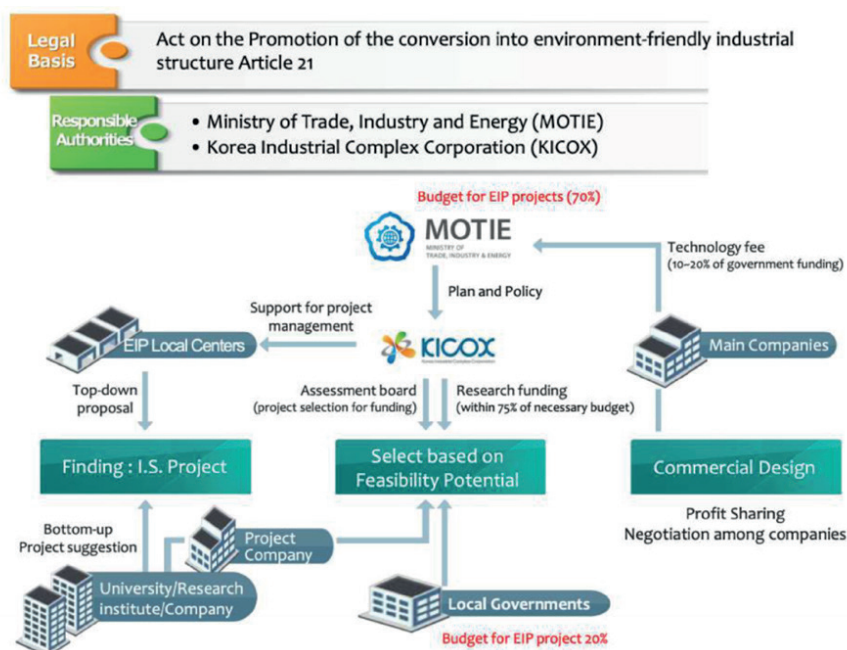
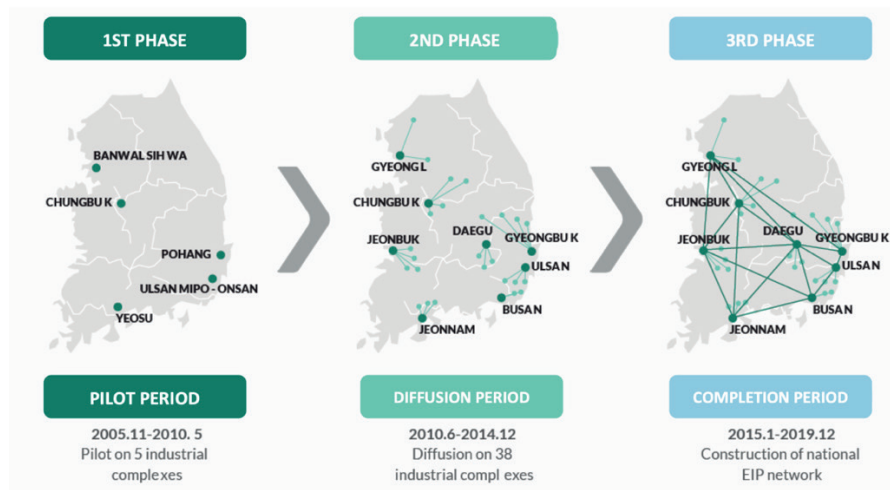
- Establish the facilitating entity by building up a brand identity, deciding on a business model, considering the necessary skillsets and qualifications, and making an internal strategy.
- Find the necessary arguments to realise the concept by getting internal support, as well as support from the local companies, and by attracting funding for the entity managing IS.
- Create symbiotic exchanges between local companies by facilitating the emergence of ideas and supported by matchmaking, research, and funding.
- Ensure the internal drive of the IS network by building a strong, open collaborative culture. Communicate the results and cooperate with external partners to ensure consistent development and refinement of both the facilitating entity and the IS, overall.

⁴⁰ <http://www.symbiosis.dk/en/inspiration/>

1.2.2. The EIP initiative in South Korea

The EIP initiative in South Korea⁴¹- EIP (Environmental, Economic), RECP, IS

Overview: Over the past decade, special economic zones have played a critical part in South Korea's rapid industrial development and have contributed to significant economic and social benefits for the country. The Korean National Cleaner Production Centre (KNCCPC) launched the National Eco-Industrial Park (EIP) programme in 2003, in line with the efforts of the Ministry of Trade, Industry, and Economy (MOTIE) to promote innovative industrial development (which simultaneously achieves environmental sustainability).



Important considerations:

As of 2015, the Korea Industrial Complex Corporation (KICOX) received 595 project proposals, out of which 388 projects were funded for further research and development (197 were executed). Both the direct and indirect benefits of the programme were significant. As a result of adopting cleaner production and industrial symbiosis (IS) facilities, from 2005 to 2014, the projects yielded emission reductions of 6.48 million tonnes of carbon dioxide (CO₂), and reductions of 1.09 million tonnes of other harmful gases. New investments in R&D and industrial infrastructure development created 848 jobs, promoted technology development, produced 56 new patents, and 100 pending patents. As of 2015, participating companies also benefited from a windfall of KRW 1,848 billion collectively (approximately USD 1,680 million) by saving resources or selling waste and by-products through IS systems.

⁴¹ https://www.greengrowthknowledge.org/sites/default/files/downloads/best-practices/GGGI%20Case%20Study_South%20Korea%20Eco-Industrial%20Park%20Program_June%202017.pdf

Achieved benefits:

- Environmental: The programme reduced a total of 6.48 tonnes of CO₂ emissions and 1.09 tonnes of other harmful gases during 2005-2014
- Social: A total of 848 new jobs were created as a direct consequence of the programme's 10 years long operation
- Economic: Private investments totalled USD 623.7 million for R&D and the construction of industrial symbiosis facilities, as well as the corresponding relevant infrastructure. This helped generate an additional income of USD 1.1 billion from selling by-products and waste for recycling. Additional energy and material savings amounted to USD 848 million.

Lessons learnt:

- The EIP programme did not achieve much success during the first couple of years. **The initial implementation plan overlooked the needs and interests of the private companies**, which were the main investors and beneficiaries of the programme. **Instead, it mostly involved researchers and academics.** This resulted in a **low participation from the business side and no IS development.** With the change of the implementation agency from KNCPC to KICOX in 2006, the EIP **implementation strategy was also adjusted to be more participatory and business-centred.**
- KICOX effectively **utilized local experts** and their networks to expand business and civil society engagement in the programme. KICOX particularly invested a great effort in engaging and **attracting resident companies in ICs, since their involvement was critical to the success of the programme.**
- KICOX focused on **delivering quick wins and demonstrating the economic profitability of the EIP projects**, especially during the early years of the programme's implementation period. KICOX strategically utilized regional EIP centres to promote the EIP programme and its benefits and strengthen the overarching business participation. **Success stories were widely promoted through both online and offline communication channels.**
- The Korean Government also employed an **effective funding scheme** to facilitate private participation and investment without causing fund recipients to become dependent or avoid accountability.
- Various government programmes supplemented **private investments by offering special loans or grants** (in most cases, to either support the implementation of proven or innovative technologies, or to reduce pollution and conserve resources).

1.2.3. The London Sustainable Industries Park, United Kingdom

The London Sustainable Industries Park - EIP (Park Management, Environmental), IS

Overview: The London Sustainable Industries Park (LSIP) in Dagenham Dock is at the heart of an exciting new public-private venture spanning the boroughs of Newham, Barking & Dagenham, and Havering.

Backed by the three local authorities, the Mayor of London and SEGRO plc have formed a partnership known as East Plus, to regenerate 86 acres of industrial land in the largest deal of its kind, between the public sector and a private land developer in the capital.

East Plus has the potential to create up to 6,500 new jobs in East London. The sites can collectively support approximately 1.4 million sq. ft of new logistics and light industrial space; and are suitable for occupiers ranging from blue-chip companies to start-up firms (including green industries). The LSIP will be the UK's largest concentration of environmental industries.



Important considerations:

The LSIP is a collaboration between London South Bank University (LSBU) and the London Borough of Southwark. It is an Eco-Industrial Park that aims to promote the use of sustainable technologies (such as renewable energy and low-carbon transportation), and to encourage resource efficiency, waste reduction, and the sharing of resources among different industries.

The LSIP is located on the campus of LSBU and is designed to be a sustainable and environmentally friendly industrial park. Its features include manufacturing, research and development, and education.

The Park is also home to the London Sustainable Industries Centre (LSIC), which is a research and development facility focusing on sustainable technologies and practices. The LSIC conducts research on sustainable technologies (renewable energy and low-carbon transportation), and provides training and education on sustainable practices. The LSIC also acts as an incubator for new and innovative sustainable technologies and provides support to start-up companies.

The LSIP is also home to several sustainable businesses and organisations, such as the London Bioenergy Centre, the London Centre for Nanotechnology, and the London Centre for Carbon Capture and Storage. These organisations are working to develop sustainable technologies and practices that can be used in industry and other sectors.

Achieved benefits:

- Excellent national and international transport links including port, rail, local transport (trams, buses, tube), as well as the Wharf
- On-site centre to recognise and promote excellence

Lessons learnt:

The following are lessons that could be learnt from the LSIP and used for replication:

1. **Collaboration:** The LSIP was developed through a collaboration between the Government, the private sector, and the community. This collaboration helped ensure that the Park met the needs of all stakeholders, including businesses, residents, and the local community.
2. **Sustainable design:** The LSIP was designed with a focus on sustainability, incorporating features such as green roofs, energy-efficient buildings, and renewable energy sources. This helped reduce the negative environmental impact of the Park and promote long-term sustainability.
3. **Innovation:** The LSIP was designed to promote innovation, with a focus on new technologies and best practices for sustainable industrial development. This helped attract businesses that are committed to sustainability and promote economic growth.
4. **Adaptability:** The LSIP was designed to be adaptable to changing market conditions and evolving technologies. This will help ensure that the Park remains relevant and sustainable over time.

5. Community engagement: LSIP developers engaged with the local community, which helped build the support needed for the project and ensured that the needs of the community were met.
6. Government incentives: LSIP was supported through governmental incentives and regulations which made it economically viable and sustainable.

1.3. Case studies from GEIPP countries

1.3.1. The PIMSA Industrial Park Malambo, Barranquilla, Colombia

PIMSA (Industrial Park Malambo, Barranquilla) in Colombia - EIP (Park Management, Environmental)

Overview: In Colombia, UNIDO is working with the management of the Industrial Park of Malambo (PIMSA). The Park is situated in the rapidly growing, urban and metropolitan area of Barranquilla. In 2016, PIMSA contributed to 17 per cent of the total exports from the Atlántico Department. This is partially attributed to PIMSA's unique location, with a proximity to the airport of Barranquilla and its own dedicated seaport, which will be expanded in the near future. Historically, PIMSA was a real estate agency providing customized buildings to tenant companies, but its function and services have continuously expanded over the past years. PIMSA is strongly committed to the vision of transitioning to an Eco-Industrial Park and extending its business model towards renewable energy and resource efficiency in industry (as well as social and economic community outreach activities).



Important considerations:

- The Park management has a clear vision and commitment to implement EIP projects and initiatives with a dedicated team of approximately 50 employees.
- PIMSA's ideal location makes it an attractive investment and relocation area for companies.
- Strong local regulations seek to offset the negative impacts of industrial activities through the creation of green spaces for the municipalities outside of the industrial park.

Achieved benefits:

PIMSA has been successful in extending its services and attracting important companies to relocate to the industrial park. PIMSA, along with associated companies, is a member of a social foundation which focuses on philanthropic projects for social and economic empowerment. Finally, PIMSA ensures the preservation of a neighbouring protected area, thanks to the creation of a buffer zone between the industrial park and this area. In this buffer zone, the development of environmentally friendly projects (e.g. construction of a solar farm) is being assessed.

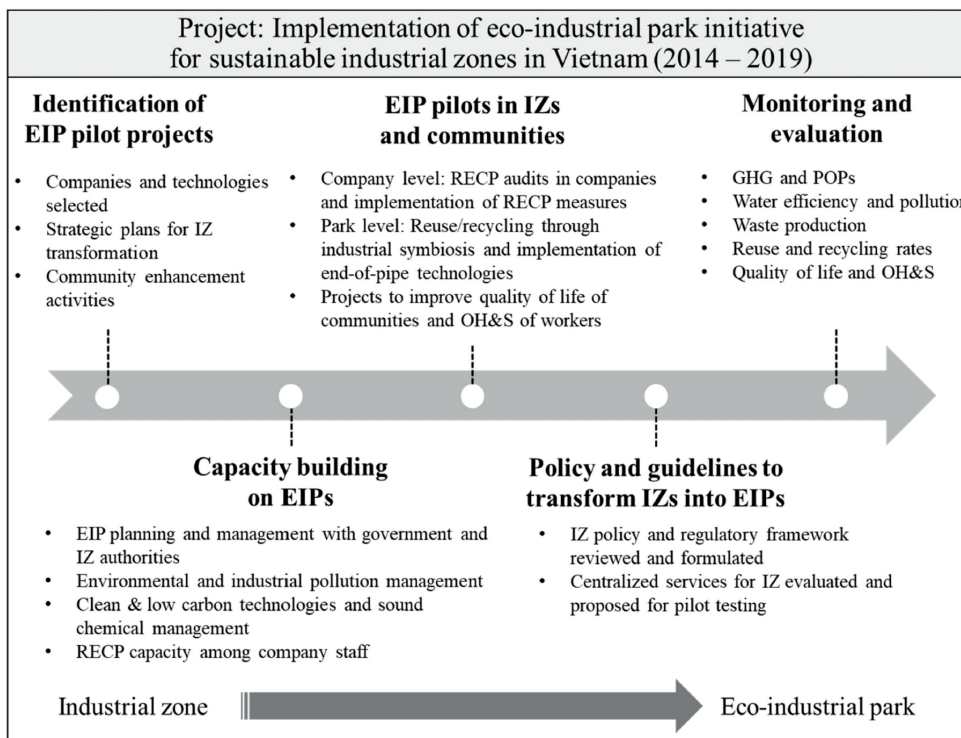
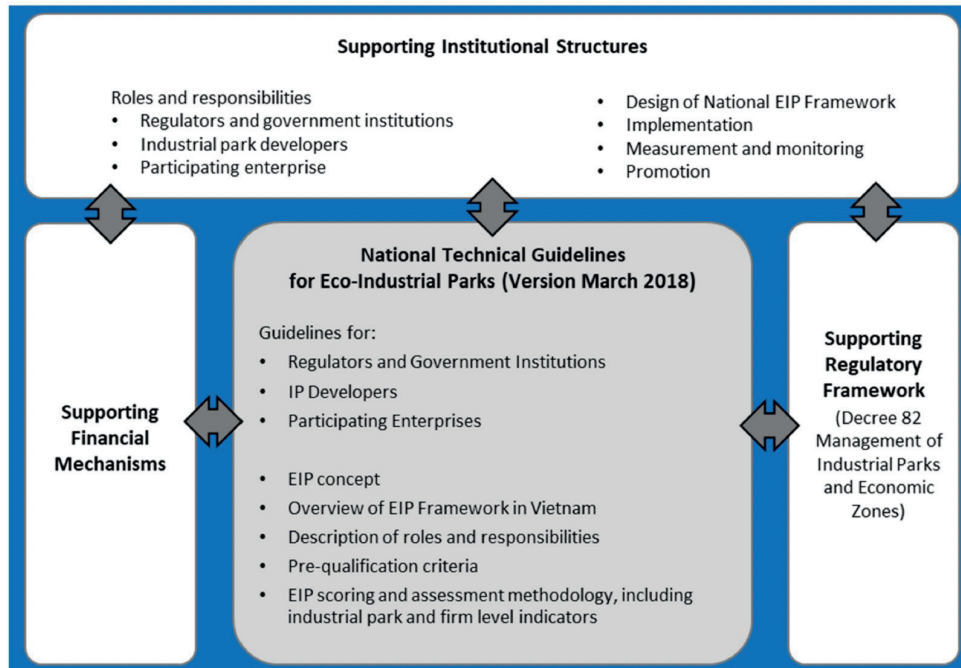
Lessons learnt:

- A detailed mandate of the role of the park management is available to increase its transparency.
- A clear, step-by-step approach is in place to manage future Eco-Industrial Park planning and concrete initiatives.
- PIMSA has a sound revenue and business model in place, ensuring that the essential costs for the provision of services (e.g., water supply, security) are self-sustained through fees.

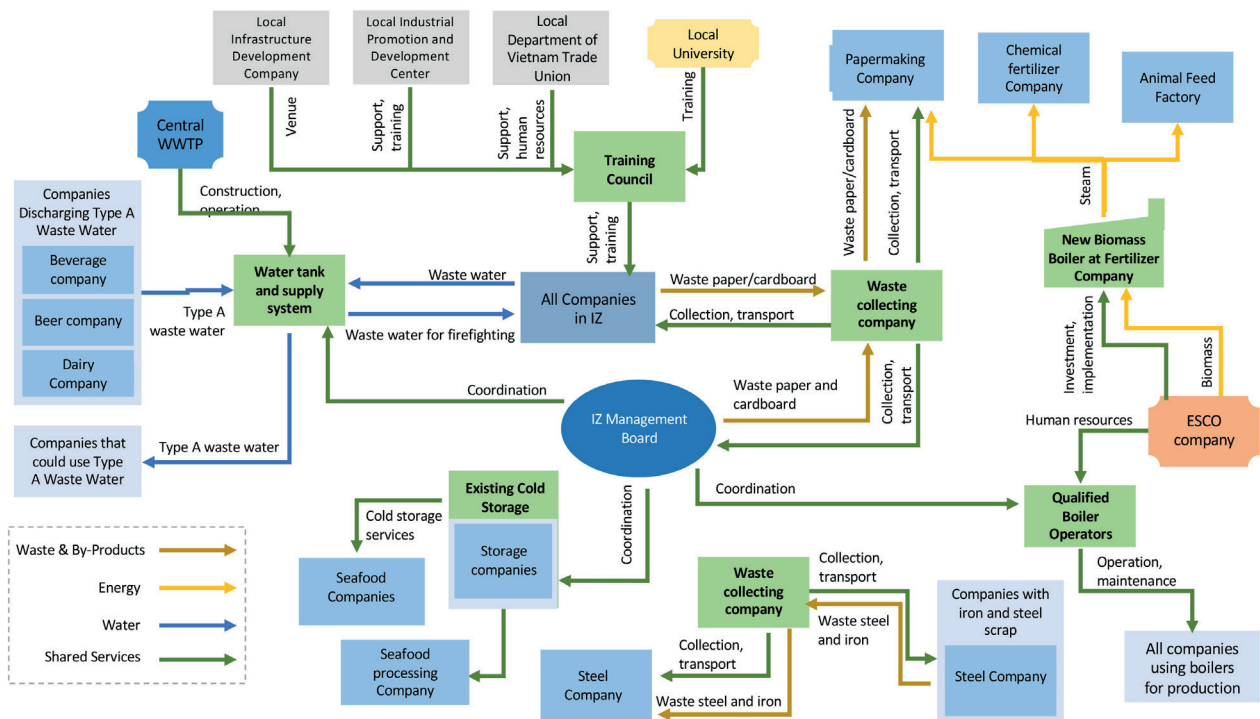
1.3.2 The sustainable industrial zones in Viet Nam

The implementation of an Eco-Industrial Park initiative for sustainable industrial zones in Viet Nam⁴² - EIP (Park Management, Environmental, Economic), IS

Overview: The project was undertaken by UNIDO to develop policies and guidelines that facilitate the transformation of industrial zones into Eco-Industrial Parks. This included implementing EIP principles in five existing industrial zones, in the provinces of Đà Nẵng (Hòa Khánh IZ), Cần Thơ (Trà Nóc 1 and 2 IZs), and Ninh Bình (Khánh Phú IZ and Gián Khẩu IZ), which serve as pilots to support replication and upscaling across Viet Nam.



42 [Eco-Industrial Park \(EIP\) Development in Viet Nam: Results and Key Insights from UNIDO's EIP Project \(2014–2019\)](#)



Important considerations:

- Policy development:** UNIDO and the World Bank Group have supported the Ministry of Planning and Investment in developing technical EIP guidelines (launched in July 2018) with the approved Decree 82/2018/ND-CP, including support to operationalize the decree through, for example, international expert group meetings. Other policy interventions undertaken as part of the project were the review of existing legislative and institutional frameworks of industrial parks toward the development of EIPs; the formulation of standards requirements; and a roadmap for developing Eco-Industrial Parks and EIP-related topic trainings and awareness-raising workshops.
- Methodology:** Resource Efficient and Cleaner Production (RECP) entails the continuous improvement of processes, products, and services in order to increase efficiency and reduce risks to humans and the environment.
- Park interventions:** The key focus of the park-level interventions was to identify and support the implementation of industrial symbioses in the pilots participating in the project (e.g., Khánh Phú IZ, Hòa Khánh IZ, and Trà Nóc 1&2 IZ). Industrial symbiosis engages traditionally separated industries in a collective approach to increase the competitive advantage of all involved parties (based on a concurrent exchange of materials, energy, water, and/or by-products).

Achieved benefits:

- The issuance of Decree 82/2018/ND-CP on the management of industrial parks and economic zones is a new policy outlining the requirements and process for transforming industrial zones into EIPs. The decree is thereby an important driver of EIP development.
- Capacity-building and awareness-raising at all levels (around 264 beneficiaries).
- The ratio of identified RECP options and their implementation is around 80%, which is considered high. RECP options related to electricity savings account for the highest proportion (over 50%) of total options identified and implemented in the parks in all three provinces.
- The process of implementing RECP options helped companies achieve substantial benefits in terms of resource efficiency (electricity, water, fuel, raw materials, chemicals, etc.), economic gains, and the reduction of emissions into the environment, along with improving the working conditions for the employees. The implemented RECP options range from simple good housekeeping practices to more complex, technological modifications.

Lessons learnt:

- Rather than stand-alone solutions, multi-disciplinary EIP concepts are most effective if applied as part of an integrated top-down approach (with policy supporting the entry point for interventions), combined with a bottom-up approach (industrial park as the entry point).
- Legal challenges with regards to EIPs still exist, including the lack of available and reliable data and the need for detailed standards and guidelines on reusing by-products, wastes, and wastewater. The final adoption of minimum EIP requirements in Viet Nam for social, economic, and environmental aspects is vital to scale up implementation.

1.4. Case studies from developing countries and emerging economies

1.4.1. The East London Industrial Development Zone (ELIDZ) in South Africa

The East London Industrial Development Zone (ELIDZ) in South Africa - RECP, IS

Overview: South Africa has a diverse range of industrial parks with allocated funds at federal, provincial, and municipal levels. This results in various greenfield and brownfield initiatives. The East London Industrial Development Zone (ELIDZ) is part of South Africa's Industrial Development Zones (IDZs), established under the Department of Trade & Industry and owned by provincial and municipal governments. Such IDZs have been successful in attracting large-scale investment and multinationals in various sectors. They represent a mix of national and international companies. ELIDZ also has a transitional management scheme through the hiring of dedicated private teams under the Government payroll. In the near future, ELIDZ should be fully licensed to a private manager.

Important considerations:

- ELIDZ is already collaborating with an industrial zone outside the park boundaries called Winsonia. This means it is possible to offer more cost-effective, common training, and industrial synergies tools that may benefit both parks.
- A new collaboration has been set up between the National Cleaner Production Centre South Africa (NCPC) and Western Cape Industrial Symbiosis Programme (WISP). WISP offers a free service that connects companies so that they can identify opportunities for (and implement) industrial symbiosis.
- ELIDZ is engaged in a lean management, pursuing a vision of financial sustainability with the support of UNIDO.

Achieved benefits:

IDZs are supported by the Government for a transition period (until they can be fully privatized). The model aims to motivate park management staff to search for financial recovery solutions and achieve full, financial self-sustainability.

ELIDZ sponsored mobile libraries and schools in the Queenstown area, donated office spaces to serve as a crime reporting centre, refurbished an old age home in the Eastern Cape township of Mdantsane, and supported sport development activities in various Eastern Cape local communities.

Lessons learnt:

ELIDZ has been successful as an Eco-Industrial Park thanks to several factors:

Infrastructure development: ELIDZ was developed with a focus on infrastructure development, including the construction of roads, railways, and ports, which provided businesses with the necessary resources and access to markets to operate effectively.

Economic incentives: ELIDZ was established with the goal of attracting new industries to the region using economic incentives (such as tax breaks and investment subsidies), which helped attract and retain businesses in the area.

Skilled labour: ELIDZ established training programmes to ensure a skilled workforce that consistently meets the needs of the industries. This helped attract and retain businesses.

Government support: ELIDZ has had a long-term commitment and support from the Government which helped ensure its sustainability and growth.

Industrial diversity: ELIDZ has a diverse range of industries (including automotive, textiles, and chemicals), which helped create a more resilient and sustainable economy.

Environmental management: ELIDZ implemented environmental management systems to reduce the negative environmental impacts of the industries, and to promote sustainable development.

Community engagement: ELIDZ has been successful in engaging with the local community and addressing the concerns of the people.

1.4.2. Awareness-raising activities in China and Viet Nam

Awareness-raising activities in China and Viet Nam - EIP, RECP, IS

Overview: In **China**, UNIDO has commissioned the Jiangsu Scitury Allied Investment and Development Co., Ltd (JSAID) to manage the conversion of an industrial area based on the promotion of RECP and industrial synergies. Approximately 10 different industrial parks are located close together, which is causing challenges in terms of awareness-raising and communication. The project initially focused on the identification and characterization of different stakeholders, which was particularly important given the complexity of the situation. After the stakeholder characterization, awareness-raising activities were designed in collaboration with JSAID, UNIDO, and the Chinese Research Academy of Environmental Science.

In **Viet Nam**, in collaboration with the Ministry of Planning and Investment, UNIDO has worked on a project aimed to transform existing industrial zones into Eco-Industrial Parks. The project has been focusing on key activities described in this chapter to increase awareness on issues concerning EIPs. Various target groups were identified and assessed, and awareness-raising materials were developed according to the interests and needs of the different target groups.



Important considerations:

- Awareness-raising tools are customized for target groups.
- Consistency in the project is maintained through coherent communications and branding.
- The best available information on current EIP development strategies is continually shared with stakeholders.

Achieved benefits:

The main benefits of awareness-raising can be observed after the completion of communication events. For instance, many banks expressed interest for investment after the financial trainings on EIPs were completed. Similarly, Government representatives indicated that the seminars were a useful source of reference to build a roadmap for implementing EIPs in Viet Nam in the future.

Lessons learnt:

Awareness-raising activities helped bolster visibility, knowledge sharing, and synergies.

1.4.3. Status quo assessment and scoping EIP interventions in India

Overview: UNIDO and the Confederation of Indian Industry – Godrej Green Business Centre (CII – Godrej GBC) fostered the development of Eco-Industrial Parks in India (in the states of Andhra Pradesh and Telangana). In addition to obtaining basic information about the implementation of EIPs, the most important objective of this project was to demonstrate the pertinence and possibility of converting standard industrial parks into EIPs.

A status quo assessment and scoping exercise was conducted to shortlist and select the most suitable industrial parks for the pilot programme. In addition to the parameters illustrated in this chapter, a high likelihood for replicability was a key criterion for taking the project forward.

Criteria	Indicator	Score
Area	1300 acres	3
No. of Units	1500 nos	5
Diversity	More than 10 sectors	5
Environment Structure	CETP	3
Replicability	High	4
Environment Concerns	High	3
Environment Initiatives	Medium	3
IALA and Industrial Association	Strength	High
Total (35)		26

Important considerations:

- More than 300 industrial parks are located in the State of Andhra Pradesh and Telangana, which was the reason for creating a systematic method to select the most suitable candidates.
- The assessment process was based on eight different criteria which could be adjusted or expanded to specific situations.

Achieved benefits:

Three parks with different features were selected. The scoping of EIP interventions highlighted the importance of RECP assessments for one of them (Jeedimetla Industrial Estate), which is comprised mainly of small and medium-sized enterprises. The assessed companies and park management staff provided positive feedback, as predicted by the status quo assessment.

Lessons learnt:

Data collection and data gap analysis for the transformation of IPs to EIPs was also enabled through the scoping exercise.

1.4.4. The EIP feasibility assessment in Nigeria

Overview: The assessments against the International EIP Framework of two industrial parks in Nigeria (Calabar Free Trade Zone and Lekki Free Zone) were produced as part of the assignment “Enabling investments towards EIPs in Nigeria and South Africa”, funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

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	Calabar Free Trade Zone	Lekki Free Trade Zone
Location	Cross River State	Lagos
Type of park	Free Trade Zone	Free Trade Zone
Total area	220 hectares	3000 hectares
Management entity	Government (NEPZA/FMITI)	Public/Private (Lagos State Government and Chinese World Wide)
Total number of factories	33 (operational)	48 (operational)



Important considerations:

- Assessing the feasibility and suitability of existing parks to become EIPs.
- Assessing opportunities for implementation of RECP and IS within the two zones.
- Assessing the potential for improving the EIP implementation.
- Identifying (through facilitation sessions with local tenant industries) at least 45 opportunities for RECP.
- Implementing more than six opportunities for IS implementation.

Achieved benefits:

Based on the review of the Calabar FTZ and the Lekki Free Zone against the International EIP Framework (and the opportunity identification workshops), a set of opportunities was identified by the industrial park stakeholders. These covered the park management, as well as the environmental, social, and economic performance of the park. The opportunities were prioritized based on their anticipated benefits, achievability, and the interest shared by the Calabar FTZ and Lekki Free Zone management/tenant companies. A training workshop was organized and well received by all participants. The workshop resulted in increased capacities of the Calabar FTZ management and the Calabar FTZ tenant companies to apply the identified RECP and industrial synergies options within their organizations.

Lessons learnt:

RECP and EIP training workshops (along with EIP feasibility assessments) can help Free Trading Zones (FTZs) and IPs to better understand and implement proposed action plans for the purpose of transitioning towards becoming EIPs.





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