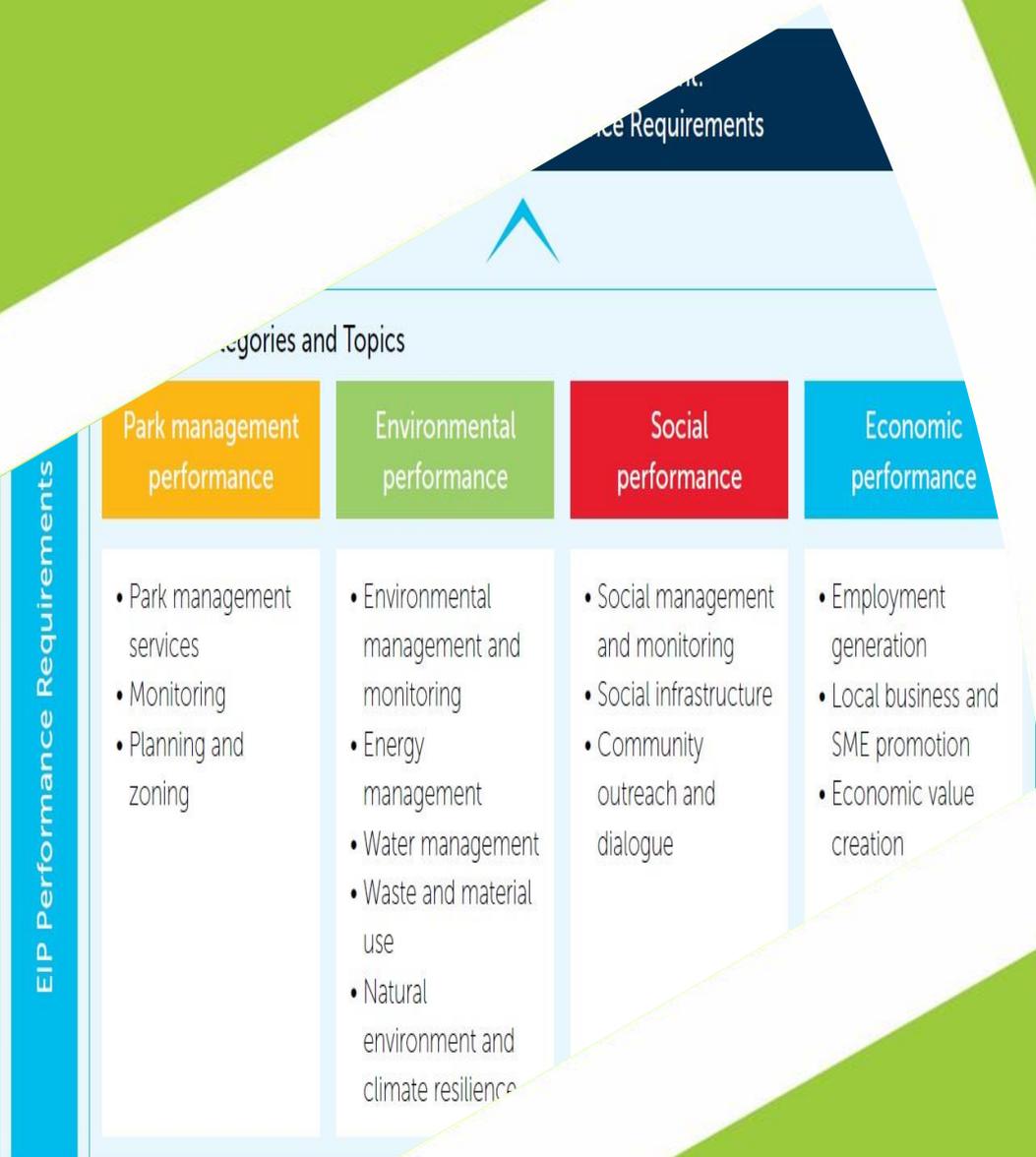


**LESSONS LEARNT FROM
ASSESSING 50 INDUSTRIAL PARKS IN
EIGHT COUNTRIES AGAINST THE INTERNATIONAL
FRAMEWORK FOR ECO-INDUSTRIAL PARKS**

DECEMBER 2020

LESSONS LEARNT SERIES

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**LESSONS LEARNT FROM ASSESSING
50 INDUSTRIAL PARKS IN EIGHT COUNTRIES
AGAINST THE INTERNATIONAL FRAMEWORK
FOR ECO-INDUSTRIAL PARKS**



2020

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EXECUTIVE SUMMARY

Introduction

This report is the first publication of the GEIPP's "Lessons Learnt" series aimed at compiling and disseminating results from the Global Eco-Industrial Parks Programme (GEIPP). The programme implements country-level interventions in Colombia, Egypt, Indonesia, Peru, South Africa, Ukraine and Viet Nam. The country-level interventions are supported by a global component that providing methodological guidance and dissemination of good practices between and beyond GEIPP countries. The program aims at demonstrating the viability and benefits for advancing Eco-Industrial Parks practices at industrial parks in the program countries. The GEIPP is made possible by funding provided by the Swiss Government through the State Secretariat for Economic Affairs of Switzerland (SECO).

Over the past years UNIDO assessed 50 parks in eight countries against the International Framework for Eco-Industrial Parks. This wealth of data offers the opportunity to analyse the results and extract lessons learnt for moving forward in assisting countries and industrial parks in their efforts for a more resilient, sustainable and socially considerate industrial development. This report provides a summary of the analysis and lessons learnt from the assessments of all these industrial parks of their performance against the International EIP Framework.

Analysis of prerequisites and indicators of International EIP Framework

UNIDO, World Bank Group and GIZ (German Development Cooperation) have collaborated to develop an international framework which provides guidance on what constitutes an eco-industrial park and how an industrial park can work towards becoming an eco-industrial park¹.

The International EIP Framework includes 51 prerequisites and performance indicators. The analysis of the collected responses to their adherence by industrial parks illustrates that the International EIP Framework can be regarded as a practical and relevant means to assess the EIP performance of industrial parks.

The analysis undertaken shows that the 50 industrial parks in eight countries assessed to date have an overall compliance/adherence of 57% against all prerequisites and performance indicators of the International EIP Framework. 21 prerequisites and performance indicators had a compliance lower than 50%. A review of the root-causes illustrates that the main compliance issue for 16 prerequisites and performance indicators seems with the industrial parks and country specific conditions. Further, there is an opportunity to refine the formulation of five EIP prerequisites and indicators in a next version of the International EIP Framework.

EIP scorings of industrial parks in eight countries

Within the context of UNIDO's work on assessing the performance of industrial parks, the total EIP scoring of an industrial park is defined as the total proportion of the 51 prerequisites and performance indicators of the International EIP Framework which are met by an industrial park.

The assessments with 50 industrial parks shows that there is a wide range in the performance of industrial parks against the International EIP Framework (the total EIP scorings). Higher average current performance against the International Framework can be found in Colombia (68%), Indonesia (67%) and Viet Nam (63%).

¹ UNIDO, WBG, GIZ (2017). An International Framework for Eco-Industrial Parks.

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



The highest average improvement potential is in Ukraine (27% improvement potential) and South Africa (25% improvement potential).

As part of the Global Eco-Industrial Parks Programme, one leading “lighthouse” industrial park has been selected in each country which has a high EIP scoring with regards to International EIP Framework. The lighthouse parks with the highest current and intended performance against the International EIP Framework can be found in Indonesia and South Africa.

Having a high performing lighthouse industrial park in a country seems to confirm that there is at least capacity in the country to develop an eco-industrial park. In this scenario, technical assistance should include a strong focus on knowledge dissemination, sharing experiences and peer-to-peer learning between industrial parks. In countries with lower scoring lighthouse parks, the technical assistance may benefit more from illustrating and demonstrating successful international experiences in EIP transformation.

Industrial parks managed by Public Private Partnerships and the private sector show a higher average EIP scoring than parks managed by the public sector. Overall, this seems to illustrate that industrial parks perform better if they are run like a private business, rather than government-managed initiatives. There are exemptions of course, for example, some well run government owned industrial parks in Viet Nam which were part of the assessment process to date.

It is noted that the results of the analysis presented in this report may include some margin of variability as the EIP assessments were conducted by multiple experts over a time period of more than two years. However, given the significant number of industrial parks assessed (50) and the use of the standardised rating options in UNIDO’s EIP Assessment Tool, the statistical error is somehow mitigated.

Contribution of eco-industrial parks to SDG 9 indicators

The transformation of conventional industrial parks into eco-industrial parks presents an opportunity to attain inclusive and sustainable industrial development and to meeting the objectives of the 2030 Agenda and the SDGs, in particular SDG 9 on Industry, Innovation, and Infrastructures.

Overall, there seems a correlation between total EIP scorings of industrial parks assessed to date and SDG 9 indicators. This positions eco-industrial parks as a practical and sound approach to support countries with meeting their SDG 9 commitments through sustainable and inclusive industrial development.

The results indicate that working towards eco-industrial park performance can positively influence a country’s performance on key indicators of SDG 9 on Industry, Innovation, and Infrastructures across continents and levels of economic development of the country. It is recognised that the influence will be relative to the contributions to GDP of industrial parks in a given country.

The analysis presented in this report serves as a starting point for studying the correlation between the SDGs and the development and implementation of eco-industrial parks. It is acknowledged that further EIP assessments, research and statistical analysis are required to refine and validate these correlations, including a sensitivity analysis, expanding the pool of industrial parks in each country, their categorisation, and enhancing the consistency in determining the EIP scorings for each industrial park.

Recommendations

Recommendation for the International Framework for Eco-Industrial Parks (UNIDO, WBG, GIZ, 2017):

- » UNIDO, WBG and GIZ to consider and follow-up on the prerequisites and performance indicators recommended for modification in a next revision of the International EIP Framework.



Recommendations for technical assistance provided through UNIDO and the Global Eco-Industrial Parks Programme:

- » The EIP assessments undertaken with 50 industrial parks to date provide insights into the technical assistance needs at country-level to transform industrial parks into eco-industrial parks. Low compliance levels with specific prerequisites and performance indicators illustrate a higher need for support to the parks in the respective countries. It is therefore recommended that UNIDO's GEIPP team analyse the EIP assessment results in countries' context to formulate customised approaches for technical assistance to the parks and guide the planning and implementation of country-level GEIPP activities;
- » Business-oriented approaches should be promoted and embedded with parks managed solely by the public sector. Examples include streamlined decision making processes within park management without unnecessary government bureaucracies, park management services which meet the needs of resident firms, and addressing key common challenges facing tenant firms (e.g. secure water and energy supply, shared utilities and infrastructures);
- » The analysis of the number of "To be confirmed" ratings of the 51 prerequisites and performance indicators of the International EIP Framework highlights the need for park management and tenant firms to extend their data collection systems. The improvement of existing data collection systems and subsequent use for decision making is a recommendation, also with regards to the type of technical assistance which is provided as part of the GEIPP.

Recommendations for further analysis and research:

- » Extend research and analysis into the root-causes of the differences and similarities of the EIP scorings at industrial park and country levels (e.g. sampling, policy and regulations, access-to-finance, human and technical capabilities, local and national conditions);
- » Analysis of the EIP country-level scorings in order to advise on action areas and entry-points to be addressed in GEIPP countries;
- » Undertake further research and statistical analysis to refine and validate the correlation between EIP performances of industrial parks and SDG 9, as well as with other SDGs such as SDG 6 (Clean Water and Sanitation), SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action).



ACKNOWLEDGEMENTS

Acknowledgements to all UNIDO team members who lead, managed and/or contributed to the EIP assessments of the 50 industrial parks in eight countries on which this report is based upon.

Special acknowledgements go to all national counterparts, staff members of the park management and tenant companies of the industrial parks which participated in and contributed to UNIDO's baseline and opportunity assessments against the International Framework for Eco-Industrial Parks:

- » **Colombia:** Parque Industrial Malambo (PIMSA), ZF de Occidente, ZF La Candelaria, ZF del Cauca, ZF del Pacífico;
- » **Egypt:** El Robbiki IP, Polaris International and Al Zamil IP, SIDC Industrial Park (in Suez Canal SEZ);
- » **Indonesia:** Batamindo IP, Bintan Inti, BSBcity, Gresik, Kabil IP, KIIC, Maspion, MM2100, Modern Cikande, Safe n Lock, Suryacipta;
- » **Nigeria:** Calabar Free Trade Zone, Lekki Free Zone;
- » **Peru:** Adepia IP, Ancón Private IP, Indupark, La Chutana IP, Lurin IZ, Sector 62 IP;
- » **South Africa:** Atlantis SEZ, Babelegi IP, Bodirelo IP, Botshabelo IP, Dube TradePort SEZ, East London IDZ, Ekandustria IP, Puthaditjaba IP, Rosslyn Automotive Supplier Park, Seshego IP, Vulindlela IP;
- » **Ukraine:** IP Agromash (Zaporizhzhia), IP BTsVAK, IP Chemical metallurgical plant, IP Patriot;
- » **Viet Nam:** Amata, Deep C1&C2, Hiep Phuoc, Hoa Khanh, Khanh Phu, Long Thanh, Pho Noi A, Tra Noc 1&2.

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

The assessments against the International EIP Framework of two industrial parks in Nigeria (Calabar Free Trade Zone, Lekki Free Zone) and two parks in South Africa (Rosslyn Automotive Supplier Park and Puthaditjaba Industrial Park) 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.



ABBREVIATIONS

A2F	Access to Finance
EIP	Eco-Industrial Park
FTZ	Free Trade Zone
GEIPP	Global Eco-Industrial Parks Programme (UNIDO)
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Development Cooperation)
IDZ	Industrial Development Zone
IFC	International Finance Corporation (part of World Bank Group)
IP	Industrial park
ISO	International Standard Organisation
IZ	Industrial Zone
OH&S	Occupational Health and Safety
PPP	Public Private Partnership
RECP	Resource Efficient and Cleaner Production
SDG	Sustainable Development Goal
SEZ	Special Economic Zone
SME	Small and Medium-sized Enterprise
UNIDO	United Nations Industrial Development Organization
WBG	World Bank Group
ZF	Zona Franca

Introduction

1



1 INTRODUCTION

1.1 THIS REPORT

This report is the first publication of the GEIPP’s “Lessons Learnt” series aimed at collecting and disseminating results from the Global Eco-Industrial Parks Programme.

The target audience for this report are EIP practitioners (e.g. development organisations, (inter)national experts, service providers), as well as (inter)national counterparts of the Global Eco-Industrial Parks Programme (e.g. industrial park management entities, government agencies, donor agencies).

This report provides a summary of the analysis and lessons learnt from the assessments of industrial parks of their performance against the International Framework for Eco-Industrial Parks. Specifically, this report covers the following:

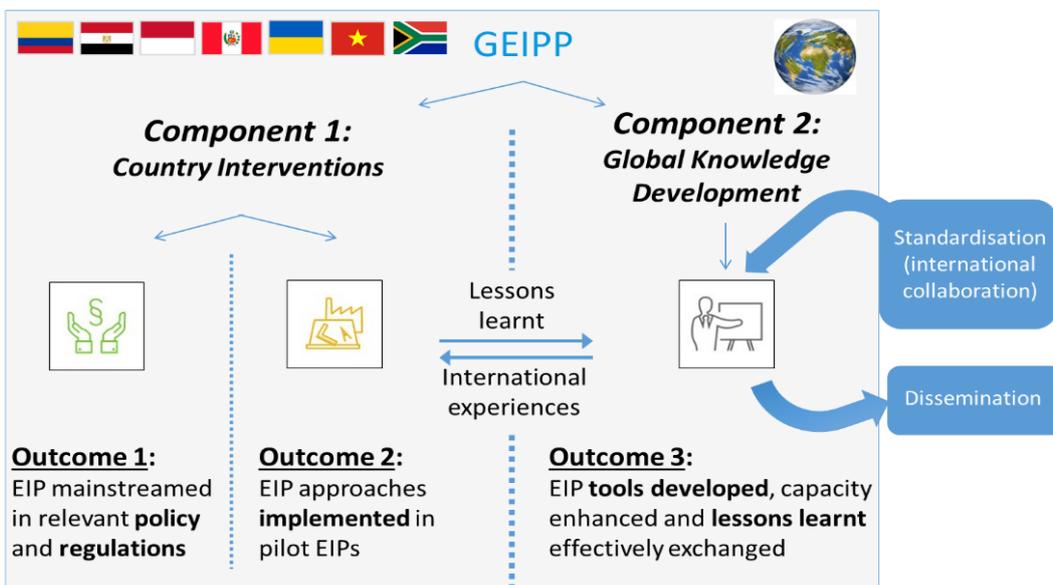
- » Analysis of the practicality, relevance and compliance levels of the prerequisites and performance indicators as outlined in International EIP Framework (Chapter 3);
- » Comparative review of the EIP assessments scorings of the 50 assessed industrial parks assessed in the eight countries (Chapter 4);
- » Initial review of the contribution of eco-industrial parks to the SDG 9 indicators (Chapter 5).

The scope of the report covers the results from 50 EIP assessments undertaken through UNIDO in eight countries from January 2018 to July 2020.

1.2 GLOBAL ECO-INDUSTRIAL PARKS PROGRAMME

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

Figure 1: Overview of Global Eco-Industrial Parks Programme





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

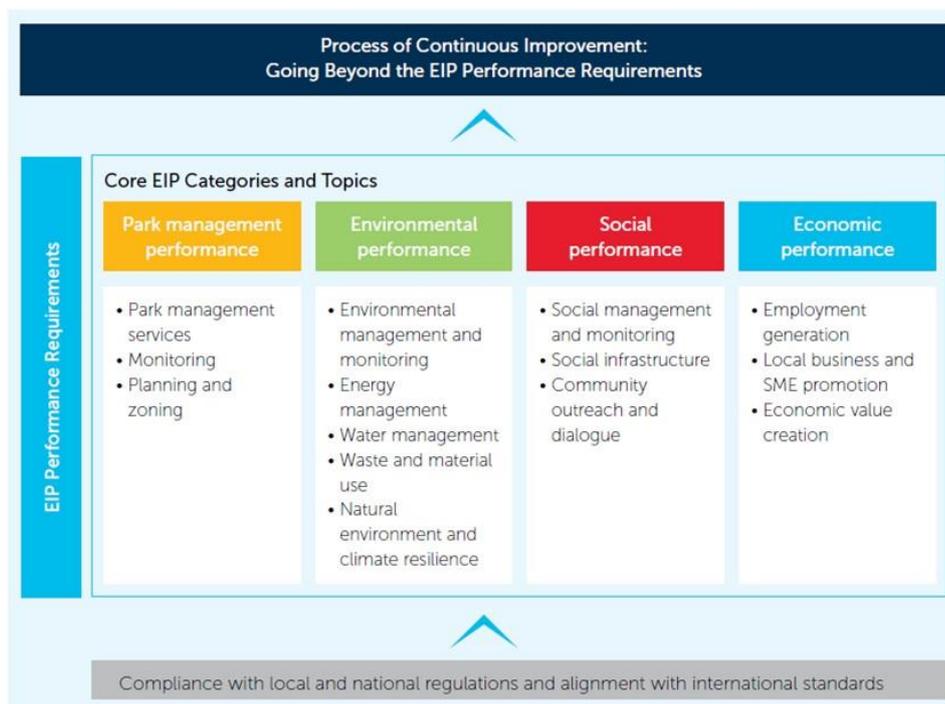
Component 2 (Global Knowledge Development) focuses on the development of specific EIP tools, providing methodological guidance and dissemination of good practices between GEIPP countries and lessons learned from international experiences.

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

1.3 INTERNATIONAL FRAMEWORK FOR ECO-INDUSTRIAL PARKS

UNIDO, World Bank Group and GIZ (German Development Cooperation) have collaborated to develop an international framework which provides guidance on what constitutes an eco-industrial park and how an industrial park can work towards becoming an eco-industrial park². As a baseline, industrial parks must comply with all applicable local and national regulations. The figure below presents the International Framework for Eco-Industrial Parks (hereafter referred to as International EIP Framework in this report). Further details on the international framework can be downloaded from the publication weblink in the footnote.

Figure 2: Overall framework for describing Eco-Industrial Parks (UNIDO, WBG, GIZ, 2017)



The framework is based on four key categories: Park management performance; Environmental performance; Social performance; and Economic performance. The requirements within each category are divided into “prerequisites” and “performance indicators,” that can be verified and measured in qualitative or quantitative terms. The prerequisites highlight the basic requirements for EIPs, and the performance indicators describe expected performance levels that an EIP must meet.

² UNIDO, WBG, GIZ (2017). An International Framework for Eco-Industrial Parks.

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



1.4 APPLICATION OF INTERNATIONAL EIP FRAMEWORK BY UNIDO TO DATE

Following the development of the International EIP Framework, an EIP Assessment Tool was developed by UNIDO to operationalise the framework. The EIP Assessment Tool assists industrial parks with (a) assessing their current and intended performance against the prerequisites and performance indicators outlined in the International EIP Framework; (b) identifying and prioritising EIP initiatives; and (c) the planning and monitoring prioritised EIP initiatives for the park.

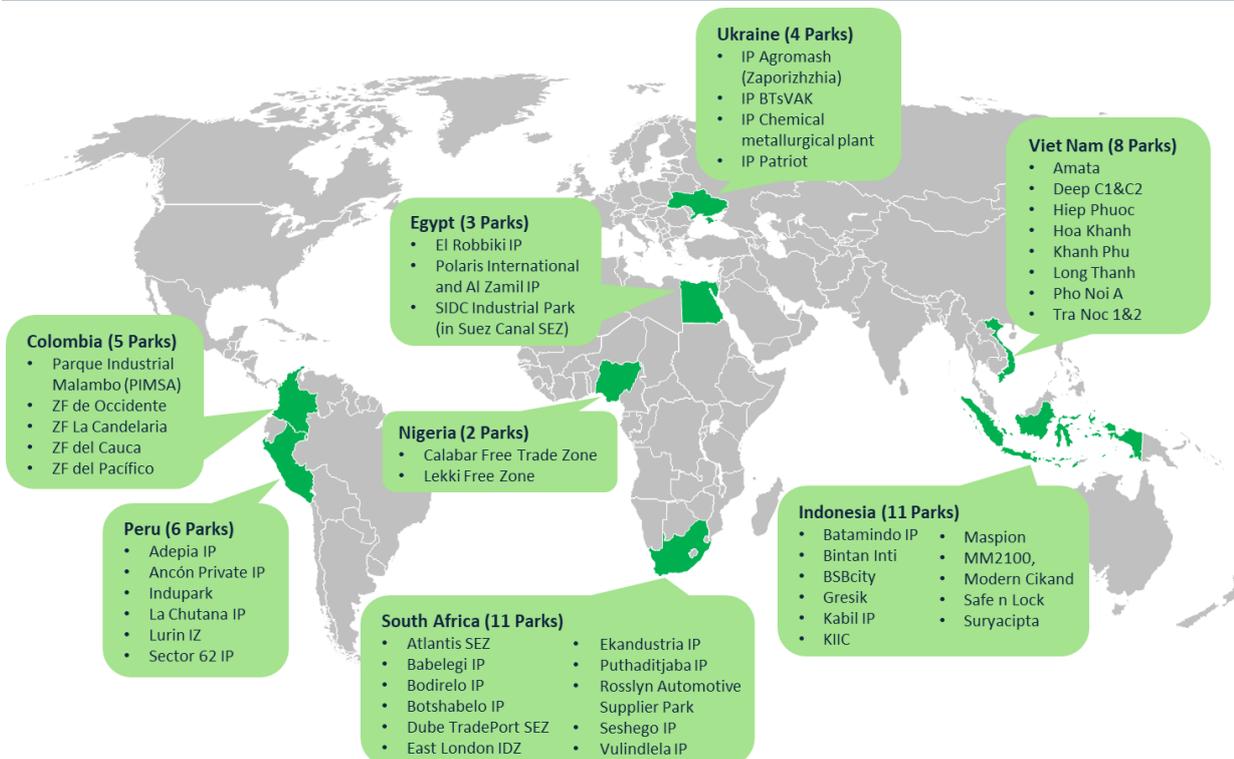
Further, the prioritisation and selection of industrial parks for their participation in the Global Eco-Industrial Parks Programme draw on the results obtained through the EIP Assessment Tool. The EIP Assessment Tool is part of UNIDO's EIP Toolbox available at: <https://greenindustryplatform.org/learning/unidos-eco-industrial-parks-eip-tools-english>.

The assessments of industrial parks covered the following elements:

- » Field visits to industrial parks to get first hand impressions of the set-up, infrastructures, utilities, tenant companies, surrounding communities, local environment, etc;
- » Interviews and workshop session(s) with park management and tenant companies to assess the current and intended performance of the industrial park against the prerequisites and performance indicators outlined in the International EIP Framework (and subsequently identify and prioritise EIP initiatives for the park as part of the EIP Assessment Tool);
- » Data collection and observations (e.g. through field visits and bilateral discussion) to validate the performance levels against the International EIP Framework;
- » Reporting back, discussing results and follow-up actions with selected industrial parks.

In summary, 50 industrial parks in eight countries (Colombia, Egypt, Indonesia, Nigeria, Peru, South Africa, Ukraine and Viet Nam) have been assessed to date on their performance against the prerequisites and performance indicators outlined in the International EIP Framework. These parks are presented in Figure 3.

Figure 3: Map showing location of 50 industrial parks in eight countries assessed to date through UNIDO



Overall methodology

2

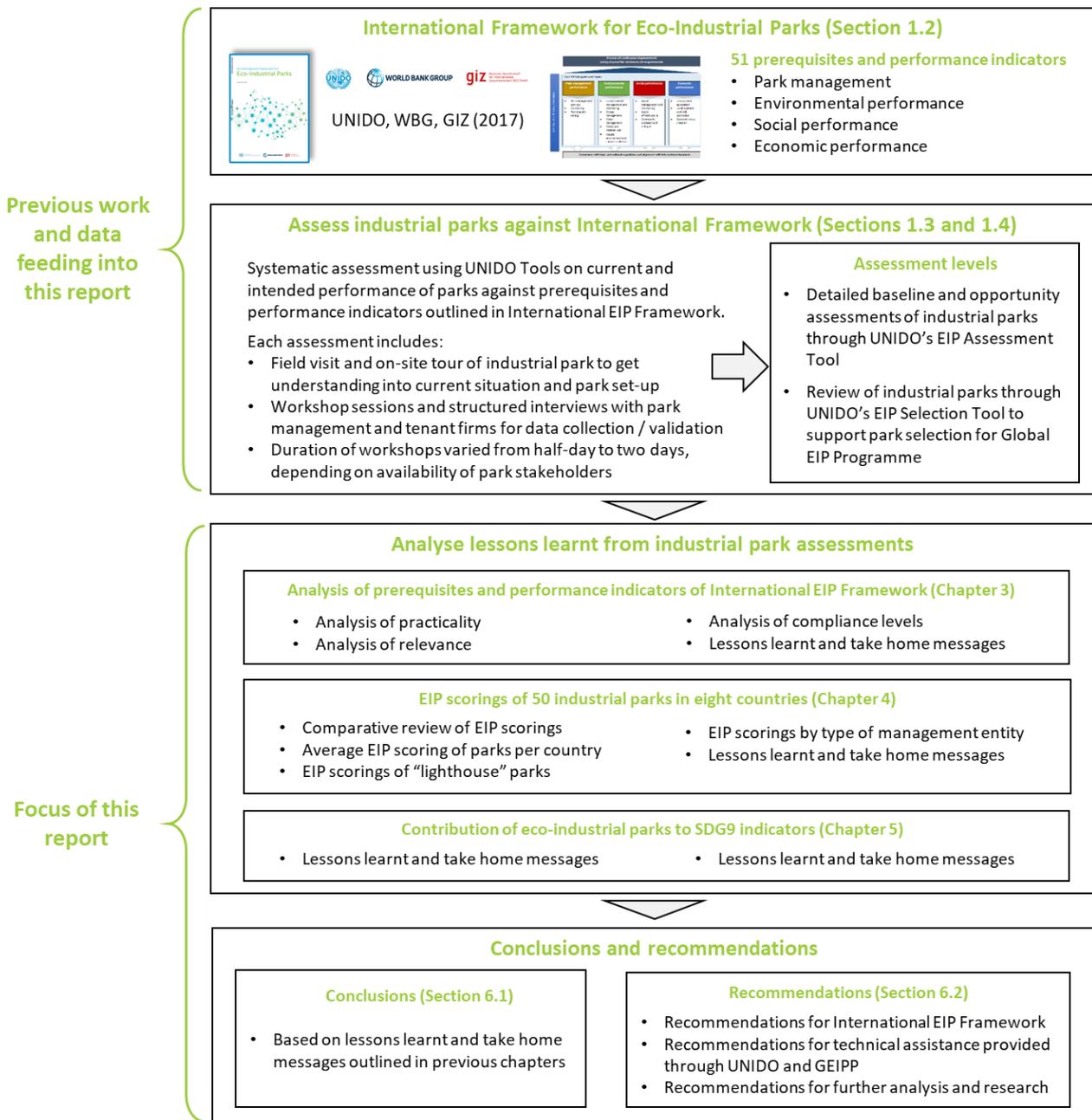
The background of the page features abstract, overlapping geometric shapes in shades of light blue and lime green. These shapes are primarily curved and angular, creating a dynamic, modern aesthetic. The lime green shapes are layered over the light blue ones, with some white gaps between them, suggesting a sense of depth and movement.



2 OVERALL METHODOLOGY

Figure 4 presents the methodology applied by UNIDO to assess the performance of the industrial parks against the International Framework for Eco-Industrial Parks in eight countries, and subsequent analysis of the lessons learnt from these assessments. The figure includes cross-references to relevant sections and chapters in this report. Each step of the methodology is further explained in the following chapters.

Figure 4: Overall methodology



Analysis of
International EIP Framework

3



3 ANALYSIS OF INTERNATIONAL EIP FRAMEWORK

3.1 OVERVIEW

As discussed in Section 1.4, UNIDO developed the EIP Assessment Tool to operationalise the International EIP Framework by assessing industrial parks on their current and intended performance against each of the 51 prerequisites and performance indicators outlined in the International EIP Framework.

The current performance applies to the time period when the EIP assessments of an industrial park has been undertaken (e.g. January 2018 to June 2020 in the context of this work). The intended performance of a park is the proportion of the EIP prerequisites and performance indicators which park management and tenant companies envisage to meet with the required technical assistance by 2024, the end of the current phase of the Global Eco-Industrial Parks Programme.

UNIDO's EIP Assessment Tool provides the following options for rating the performance of industrial parks against each prerequisite and performance indicator:

- » **"Yes"**: Industrial park fully meet the prerequisite / performance indicator;
- » **"No"**: Industrial park does not meet the prerequisite / performance indicator;
- » **"Partly"**: Industrial park meet large parts of the prerequisite and made efforts to work on this, but prerequisite is not fully met yet. "Partly" rating is only possible for prerequisites, as performance indicators include percentage levels which are either met or not;
- » **"To be confirmed"**: Further data is required to decide on whether or not the park meets the prerequisite / performance indicator;
- » **"Not applicable"**: Prerequisite / performance indicator is not applicable to industrial park (e.g. park does not have companies with more than 250 employees, whereas an indicator applies only to companies with more than 250 employees).

In order to arrive at learnings for the current version of the International EIP Framework (UNIDO, WBG, GIZ, 2017) through a systematic process, the ratings of the prerequisites and performance indicators for the 50 industrial parks in eight countries were analysed on the following:

- » **Their practicality**: Analysis of which and how many prerequisites and performance indicators were rated as "To be confirmed". If a prerequisite / indicator has a high proportion of "To be confirmed" ratings across all industrial parks assessed, it indicates that it is not very practical as its underlying data is mostly not available or collected;
- » **Their relevance**: Analysis of which and how many prerequisites and performance indicators were "Not applicable". Prerequisites / indicators with a high proportion of "Not applicable" ratings across all parks imply their lesser relevance;
- » **Their compliance**: Analysis which and how many prerequisites and performance indicators were rated as "Yes". Rating "Yes" illustrates full compliance with a prerequisite / indicator .

Section 3.2 summarises the lessons learnt and take home messages from this analysis. The detailed analysis on each of these three criteria are included in Annex A of this report.



3.2 LESSONS LEARNT AND TAKE HOME MESSAGES

The key lessons learnt and take home messages from the analysis of the practicality, relevance and compliance levels of the EIP prerequisites and performance indicators of International EIP Framework are:

- » **Practicality:** Overall, 19% of all ratings given to applicable prerequisites and indicators were “To be confirmed”. This illustrates that the International EIP Framework can be regarded as a practical means to assess the EIP performance of an industrial park. Industrial parks where a high number of “To be confirmed” ratings were recorded may not yet have the data collection systems, implementation mechanisms, confidence and/or capabilities to undertake the community outreach and dialogues. Further, there is an opportunity to further strengthen the formulation of five performance indicators in the International EIP Framework in order to lower the number of “To be confirmed” ratings in future EIP assessments, and thereby increase the practicality of the international framework;
- » **Relevance:** Prerequisites / indicators with a high proportion of “Not applicable” ratings across all parks imply their lesser relevance. Based on the EIP assessments undertaken to date, only 2% of all ratings given to prerequisites and indicators were “Not applicable”. This illustrates that almost all prerequisites and performance indicators outlined in the International EIP Framework are relevant to the industrial parks. There is only one prerequisite which has a relevance lower than 70%;
- » **Compliance:** The prerequisites and performance indicators in the International EIP Framework have an overall compliance of 57% based on the EIP assessments undertaken to date. 21 prerequisites and performance indicators have a compliance lower than 50% calculated across all 50 parks assessed in eight countries. A review of the root-causes illustrates that the main compliance issue for 16 prerequisites and performance indicators largely seems with the industrial parks and country specific conditions. Further, there is an opportunity to refine the formulation of five EIP prerequisites and indicators outlined in the International EIP Framework in order to increase compliance (number of “Yes” ratings”) for realistic performance levels expected from EIPs.

Based on the analysis detailed in Annex A, the following table provides an overview of the prerequisites and performance indicators recommended for modification in a next version of the International EIP Framework, including their underpinning reason(s) from a practicality, relevance and compliance level perspective.

It is outside the scope of this analysis to come up with recommendations on how to modify the prerequisites and indicators. This is recommended through a collaborative exercise between UNIDO, WBG and GIZ, and possibly other stakeholders.



Table 1: Recommendations to modify prerequisites and indicators

Category	Topic	Prerequisites / indicators recommended for modification	Reason to modify prerequisite / indicator		
			Strengthen PRACTICALITY (Reduce number of "To be confirmed" ratings)	Strengthen RELEVANCE (Reduce number of "Not applicable" ratings)	Strengthen COMPLIANCE LEVELS (Increase number of "Yes" ratings for realistic performance levels expected from EIPs)
Park management	Monitoring and risk management	At least every 6 months, park management entity monitors and prepares consolidated reports regarding the achievement of target values (as documented in this framework) to encompass the following: Environmental performance; Social performance; Economic performance; and Critical risk management at the level of the park.			X
Environmental performance	Energy	An industrial heat recovery strategy is in place to investigate opportunities for heat and energy recovery for the major energy-consuming firms in the park. (Typically, these are firms that individually consume at least 10-20 percent of total firm level energy consumption).			X
		Park management entity sets and works toward ambitious (beyond industry norms) maximum carbon intensity targets (maximum kilograms of carbon dioxide equivalent (kg CO ₂ -eq) / kilowatt hour (kWh) for the park and its residents. Targets should be established for the short, medium, and long term, in line with local norms and industry sector benchmarks.			X
		Park management entity sets and works toward ambitious maximum energy intensity targets per production unit (kWh/\$ turnover) for the park and its residents. Targets should be established for the short, medium, and long term, in line with local norms and industry sector benchmarks.			X
	Water	At least 50% of total industrial wastewater from firms in the park is reused responsibly within or outside the industrial park.			X
Social performance	Social management systems	At least 75% of all firms in the industrial park with more than 250 employees have a harassment prevention and response system in place.	X		
	Social infrastructure	At least 80% of the surveyed employees report satisfaction with social infrastructure.	X		
		At least 20% of female workforce benefit from available supporting infrastructure/programs for skills development.	X		
	Local community outreach	At least 80% of surveyed community members are satisfied with the community dialogue.	X		
Economic performance	Employment generation	Park management entity has plans to generate specific numbers and types of jobs (including diversity and inclusiveness) in line with government targets.		X	
	Local business and SME promotion	At least 25% of resident firms use local suppliers or service providers for at least 80 percent of their total procurement value.	X		

EIP scorings of 50 industrial parks
in eight countries

4





4 EIP SCORINGS OF 50 INDUSTRIAL PARKS IN EIGHT COUNTRIES

4.1 OVERVIEW

The total EIP scoring of an industrial park is defined as the total proportion of the 51 prerequisites and performance indicators of the International EIP Framework (UNIDO, WBG, GIZ, 2017) which are met by an industrial park. As outlined in Section 3.1, UNIDO's EIP Assessment Tool has been used to assess the industrial parks. The tool provides the following options for rating the performance of industrial parks against each prerequisite and performance indicator: "Yes", "No", "Partly", "To be confirmed", and "Not applicable".

This chapter provides a comparative analysis of the EIP scorings of the 50 industrial parks assessed in eight countries, including overview of EIP scorings of all parks, average EIP scoring per country, EIP scorings of the lighthouse "model" industrial parks selected for each GEIPP country, as well EIP scorings by type of management entity.

The total EIP scorings presented in this GEIPP report are calculated using a "realistic performance" approach³³. In addition to the counting the "Yes" ratings for prerequisites and performance indicators, the approach allocates a weighting of 0.5 to "To be confirmed" and "Partly" ratings. If a rating is "To be confirmed" because data is currently not available, the actual real performance can either be a "Yes" or "No". Prerequisites rated as "Partly" are reflected in the total EIP scoring in order to acknowledge the efforts of park management and firms to implement the prerequisites. This "realistic performance" method is most suitable in situations where the International EIP Framework is used as a basis to understand the actual performance of an industrial park and subsequent identification and development of EIP initiatives.

It is noted that the results of the analysis presented in this chapter may include some margin of variability. The EIP assessments were conducted by a small team of experts, covering disciplines of engineering, management consulting, and social science. However, given the significant number of industrial parks assessed (50) and the use of the standardised rating options in UNIDO's EIP Assessment Tool (i.e. "Yes, No, Partly, To be confirmed"), the statistical error is somehow mitigated.

4.2 EIP SCORINGS OF 50 PARKS IN EIGHT COUNTRIES

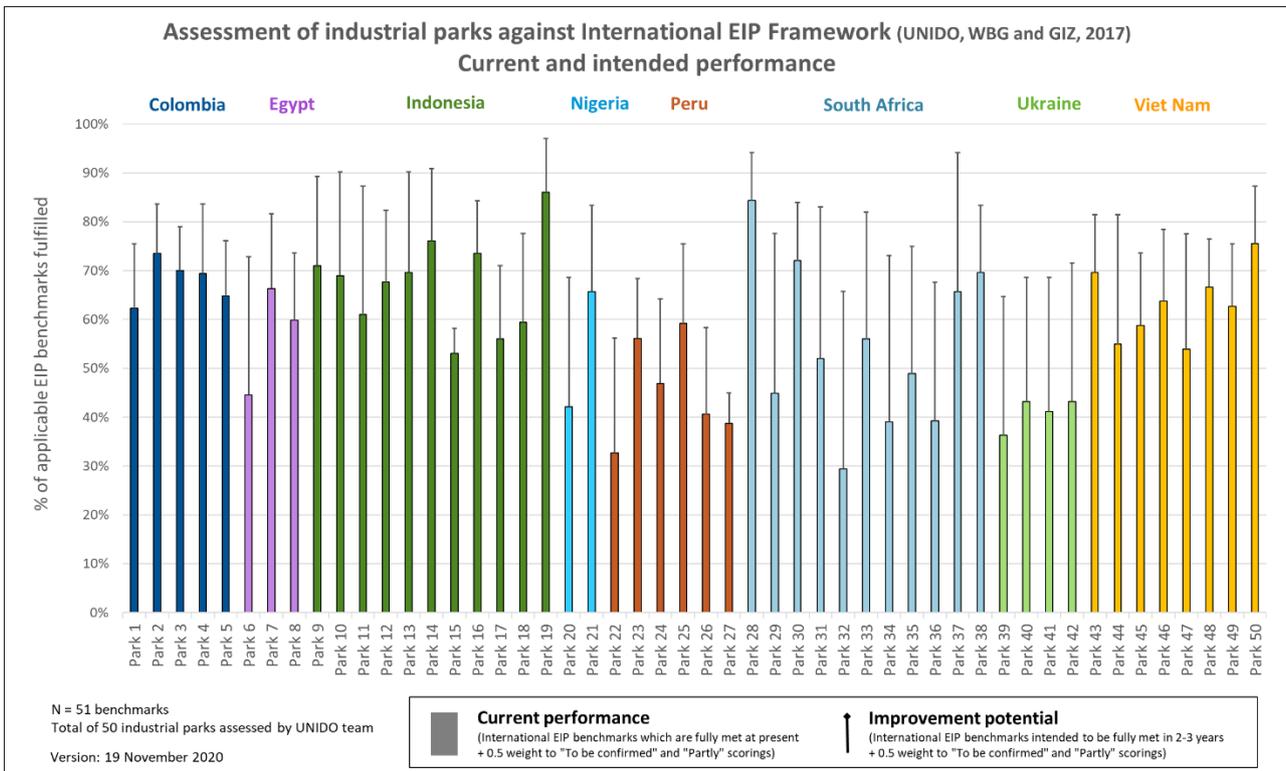
The following figure presents the EIP scorings of the current and intended performance of the 50 industrial parks assessed in the eight countries. It illustrates that there is a wide range in current and intended performance against the International EIP Framework.

High performing parks are expected to have implemented most "easy to do" solutions while lower performing parks are in their earlier EIP development stages. Therefore, it is anticipated that industrial parks with a lower EIP scoring will have a higher proportion of lower cost initiatives to transform towards an eco-industrial park compared to higher performing industrial parks.

³³ Applied formula for total EIP scoring under the realistic performance" approach = (Counts "Yes" + Counts "To be confirmed" * 0.5 + Counts "Partly" * 0.5) / (Total number of responses - Counts "Not applicable").



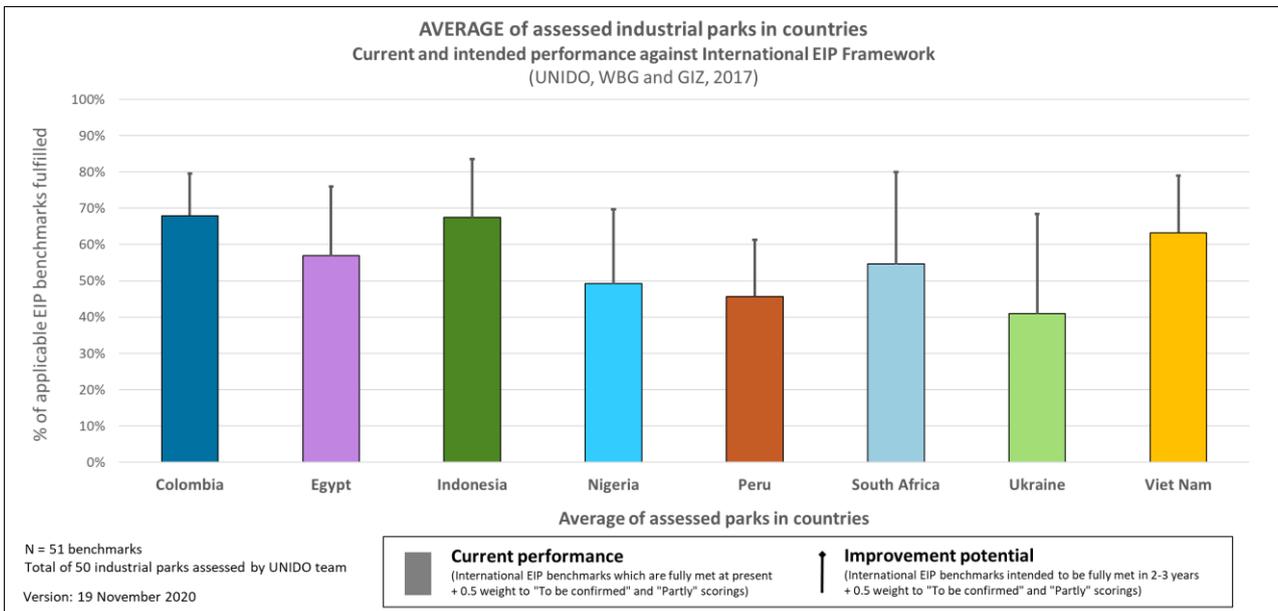
Figure 5: Current and intended performance of 50 industrial parks in eight countries



4.3 AVERAGE EIP SCORING OF ASSESSED PARKS PER COUNTRY

Figure 6 below presents the average EIP scoring of the current and intended performance of all industrial parks assessed per country. The figure shows that higher average current performance against the International EIP Framework can be found in Colombia (68%), Indonesia (67%) and Viet Nam (63%). Highest average improvement potential is in Ukraine (27%) and South Africa (25%), meaning the highest difference between their current performance against International EIP Framework and intended performance (e.g. in three years time at end of current phase of the Global EIP Programme).

Figure 6: Average EIP score of assessed parks per country





4.4 LIGHTHOUSE INDUSTRIAL PARKS

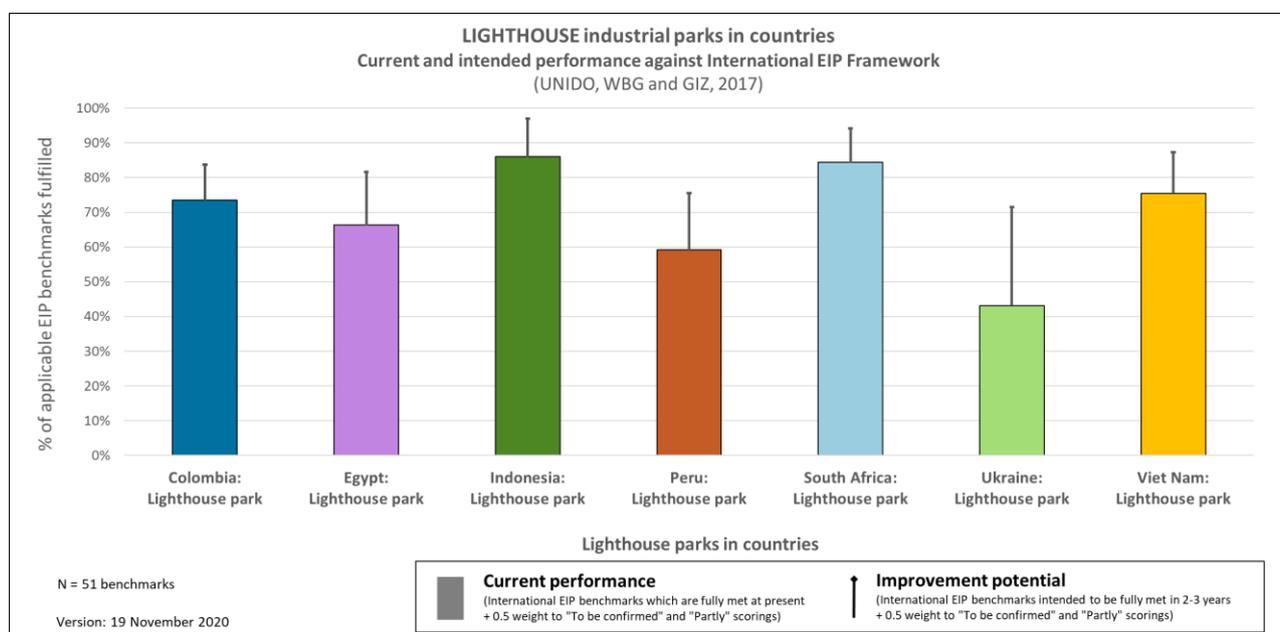
As part of the Global Eco-Industrial Parks Programme (GEIPP), one leading “lighthouse” industrial park has been selected in each country which has a high EIP scoring with regards to International EIP Framework. These lighthouse parks are selected to serve as practical example of an eco-industrial park in each country.

4.4.1 EIP scorings of lighthouse industrial parks per country

The EIP scorings of the lighthouse parks for each of the GEIPP countries are presented in following figure. Data from Nigeria is not included in this figure as Nigeria is currently not participating in UNIDO’s GEIPP. Therefore, a leading “lighthouse” industrial park has not been selected in Nigeria.

The figure illustrates that the lighthouse parks with the highest current and intended performance against the International EIP Framework can be found in Indonesia (lighthouse park with current performance of 86% and intended performance of 97%) and South Africa (lighthouse park with current performance of 84% and intended performance of 94%).

Figure 7: EIP scorings of lighthouse industrial parks per country



4.4.2 Lighthouse parks versus “average” of industrial parks

Figure 8 presents the current and intended performance of the lighthouse parks in relation to the average EIP scoring of all assessed parks per country. As expected, the selected lighthouse parks have a higher total EIP scoring than the average score of industrial parks assessed in their respective countries. Further, the figure illustrates that the highest difference between lighthouse park and average of the parks are in Indonesia and South Africa, indicating differences in park management approaches and ability of parks to attract new “modern” tenant companies.

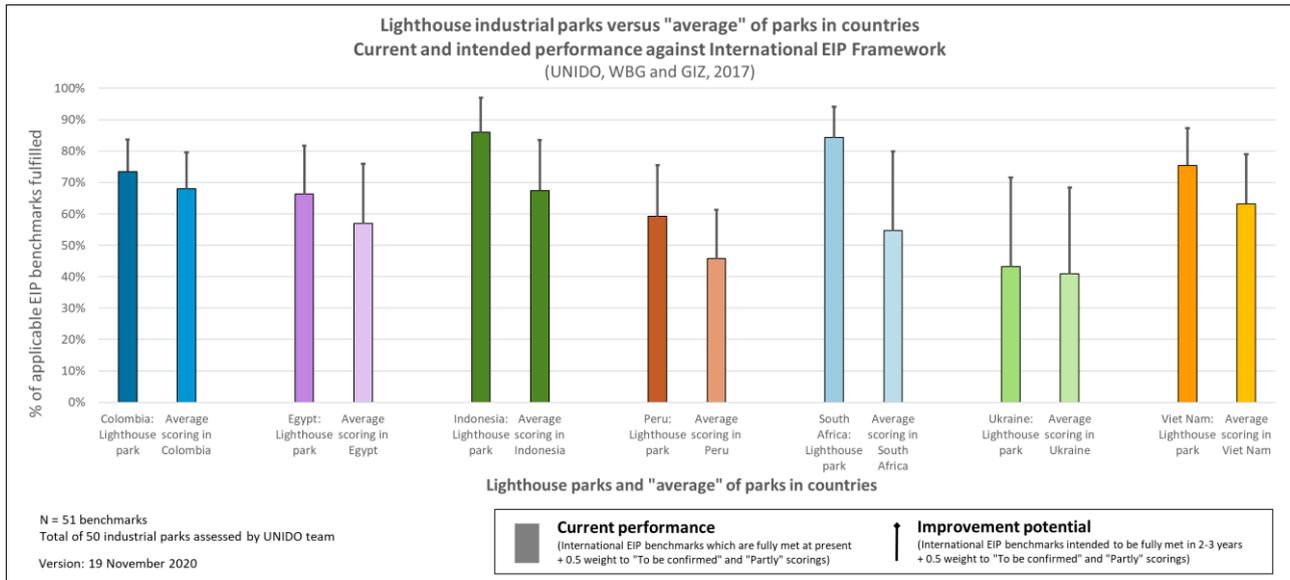
In terms of technical assistance to the parks, the following preliminary observations can be made (subject to further analysis and discussion in a following GEIPP lessons learnt report):

- » In the scenario of having a high performing lighthouse in a country, technical assistance should include a stronger focus on knowledge dissemination, sharing experiences and peer-to-peer learning between industrial parks;



- » In the scenario where there is not yet a lighthouse park with a very high EIP performance in a country, technical assistance can draw more from international experience and should have a stronger focus on capacity building with industrial park management entities and support to government agencies to drive EIP policy development and implementation;
- » Comparatively even EIP scorings in across industrial parks in a country, similar technical assistance may be suited for a large number of industrial parks in the respective country for advancing their EIP transformation.

Figure 8: Lighthouse parks versus “average” of industrial parks



4.5 EIP SCORINGS BY TYPE OF PARK MANAGEMENT ENTITY

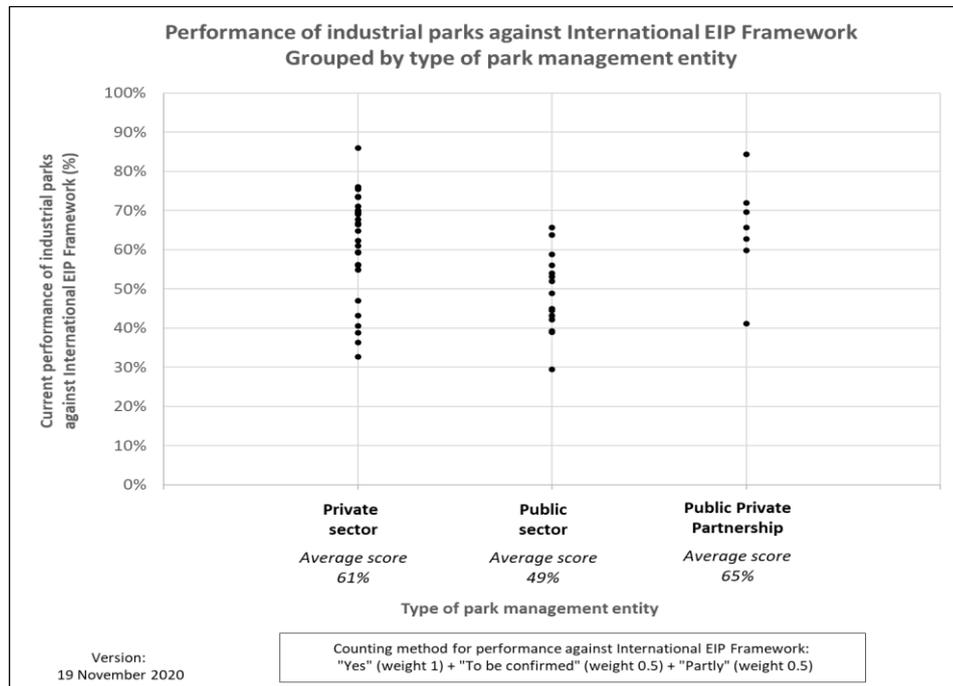
As park management plays a critical role as the entry point and driver to achieve the objectives of EIPs in close collaboration with resident firms, relevant government agencies and the wider community. Therefore, it is of interest to review to the relationship between the different types of park management entity and the performance of the parks against the International EIP Framework.

The following figure presents the EIP scorings of the current performance of the 50 assessed industrial parks in the eight countries, grouped by type of management entity (e.g. private sector, public sector, and Public Private Partnership). Each dot represents an industrial park which has been assessed.

Figure 9 illustrates that industrial parks managed by Public Private Partnerships (PPPs) and the private sector have a higher average EIP scoring than parks managed by the public sector. Overall, this seems to illustrate that industrial parks perform better if they are run like a private business, rather than a government-managed initiative. There are exemptions, for example, some well run government owned industrial parks in Viet Nam. It is noted that this figure does not represent a full statistical analysis, and further work is required to validate these findings.



Figure 9: EIP scorings by type of park management entity



4.6 LESSONS LEARNT AND TAKE HOME MESSAGES

Based on the analysis undertaken and discussion in this chapter, key lessons learnt and take home messages on the EIP scorings of 50 industrial parks in eight countries are:

- » ***EIP scorings of 50 parks in eight countries:*** There is a wide range in current and intended performance of industrial parks against the International EIP Framework. Higher average current performance can be found in Colombia, Indonesia and Viet Nam. The highest average improvement potential is in Ukraine and South Africa;
- » ***EIP scorings of lighthouse industrial parks:*** As part of the GEIPP, one leading “lighthouse” industrial park has been selected in each country which has a high EIP scoring with regards to International EIP Framework. These lighthouse parks are selected to serve as practical examples of eco-industrial parks in their respective countries. The EIP scorings of the lighthouse parks and average EIP scoring across all parks assessed in each country can assist with the formulation of technical assistance needs to transform parks in EIPs (e.g. stronger focus on knowledge dissemination, sharing experiences and peer-to-peer learning between industrial parks versus a stronger focus on capacity building with industrial park management entities and support to government agencies to drive EIP policy development and implementation);
- » ***EIP scorings by type of park management entity:*** Based on the EIP assessments undertaken to date, industrial parks managed by public-private partnerships and private sectors have a higher average EIP score than parks managed by the public sector. Overall, this seems to indicate that industrial parks perform better if they are run like a business, rather than a government-managed initiatives, independent of land ownership. It may further indicate that some public sector lead parks established for wider reasons such as regional or municipal economic development initiatives are not run as efficient and may as consequence have difficulties in attracting high-value tenants.

Contribution of eco-industrial
parks to SDG 9 indicators

5





5 CONTRIBUTION OF ECO-INDUSTRIAL PARKS TO SDG 9 INDICATORS

5.1 OVERVIEW

The Sustainable Development Goals (SDGs) are a collection of 17 global goals designed to be a "blueprint to achieve a better and more sustainable future for all". The SDGs set in 2015 by the United Nations General Assembly are intended to be achieved by the year 2030, are part of UN Resolution 70/1, the 2030 Agenda.

As developing and emerging economies seek to increase industrial output, there is also a pressing need to decouple economic growth from environmental and resource inefficiencies to meet wider social objectives.

There is very real need to strategically plan and effectively manage industrial parks to help achieve desired economic, social, and environmental targets. As a result, the transformation of conventional industrial parks into eco-industrial parks presents an opportunity to attain inclusive and sustainable industrial development and to meeting the objectives of the 2030 Agenda and the SDGs, in particular SDG 9 on Industry, Innovation, and Infrastructures.

Based on the EIP assessments undertaken to date by UNIDO, this chapter provides an initial review of the correlation of eco-industrial parks to SDG 9 indicators considered most relevant to eco-industrial parks (SDG 9 indicators marked in grey in Table 2 below).

Table 2: Overview of SDG 9 indicators considered most relevant to (eco-)industrial parks (marked in grey)

SDG 9 targets	SDG 9 indicators
9.1. Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.	<ul style="list-style-type: none"> Indicator 9.1.1: Proportion of the rural population who live within 2 km of an all-season road; Indicator 9.1.2: Passenger and freight volumes, by mode of transport.
9.2. Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries.	<ul style="list-style-type: none"> Indicator 9.2.1: Manufacturing value added as a proportion of GDP and per capita; Indicator 9.2.2: Manufacturing employment as a proportion of total employment.
9.3. Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.	<ul style="list-style-type: none"> Indicator 9.3.1: Proportion of small-scale industries in total industry value added; Indicator 9.3.2: Proportion of small-scale industries with a loan or line of credit.
9.4. By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.	<ul style="list-style-type: none"> Indicator 9.4.1: CO₂ emission per unit of value added.
9.5. Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.	<ul style="list-style-type: none"> Indicator 9.5.1: Research and development expenditure as a proportion of GDP; Indicator 9.5.2: Researchers (in full-time equivalent) per million inhabitants.
9.a. Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States.	<ul style="list-style-type: none"> Indicator 9.a.1: Total official international support (official development assistance plus other official flows) to infrastructure.



SDG 9 targets	SDG 9 indicators
9.b. Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities.	<ul style="list-style-type: none"> Indicator 9.b.1: Proportion of medium and high-tech industry value added in total value added.
9.c. Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.	<ul style="list-style-type: none"> Indicator 9.c.1: Proportion of population covered by a mobile network, by technology.

5.2 CORRELATION SDG 9 INDICATORS AND EIP PERFORMANCE OF INDUSTRIAL PARKS

5.2.1 Theory

In statistics, correlation or dependence is any statistical relationship, whether causal or not, between two random variables. Correlations imply a predictive relationship that can be utilised and analysed. A correlation coefficient is a numerical measure of some type of correlation, meaning a statistical relationship between two variables. A correlation coefficient is used to show how the scores from one measure relate to scores on a second measure for the same sample⁴.

The Pearson correlation coefficient (r), also referred to as Pearson's r , is a statistic coefficient that measures linear correlation between two variables. The Pearson correlation coefficient has a value between +1 and -1. A value of +1 is total positive linear correlation, 0 is no linear correlation, and -1 is total negative linear correlation⁵.

The strength of any relationship naturally depends on the specific pair of variables. Some correlation questions involve weaker relationships than other subject areas. In the context of this report, industrial parks are hard to predict. Each industrial park is unique with regards to its specific location, size, development stage, park management entity, local economic, environmental and social conditions. Therefore, an analysis of relationships between industrial parks and SDG 9 indicators can be expected to have correlation coefficients weaker than +/- 0.6⁶.

In social sciences and complex real-life situations (such as multi-disciplinary assessments of industrial parks in different countries), the following scale is chosen to categorise the correlation⁷:

- » Correlation is relatively strong if $r = +/- 0.5$;
- » Correlation is moderate if $r = +/- 0.3$;
- » Correlation is low if $r = +/- 0.1$.

⁴ It is noted that correlation cannot determine cause and effect and it cannot indicate which of those variable is influencing the other. In some cases, there could even be a third variable, unmeasured factor that is the real cause of the observed correlation between two surveyed variables. <https://www.custominsight.com/articles/correlation-sample.asp>.

⁵ Text extracted from: https://en.wikipedia.org/wiki/Pearson_correlation_coefficient#cite_note-2.

⁶ Reasoning based on: <https://statisticsbyjim.com/basics/correlations/>

⁷ <https://statistics.laerd.com/statistical-guides/pearson-correlation-coefficient-statistical-guide.php>;
<https://www.simplypsychology.org/correlation.html>



5.2.2 Results from analysis

Table 3 and Figure 10 to Figure 14 present the average EIP scorings of the parks and the values for selected SDG 9 indicators by country, and the subsequent Pearson correlation coefficient between these variables.

The table and figures illustrates the following:

- » There seems a relative strong correlation between the performance of parks against the International EIP Framework (EIP scoring) and SDG indicator 9.2.1 (Manufacturing value added as a proportion of GDP, $r = 0.54$) and SDG indicator 9.2.2 (Manufacturing employment as a proportion of total employment, $r = 0.48$);
- » There seems a moderate correlation between the performance of parks against the International EIP Framework (EIP scoring) and SDG indicator 9.2.1 (Manufacturing value added per capita, $r = 0.34$), SDG indicator 9.4.1 (CO₂ emission per unit of value added, $r = -0.34$) and SDG indicator 9.b.1 (Proportion of medium and high-tech industry value added in total value added, $r = 0.27$).

Important note: The analysis presented here serves as a starting point for studying the correlation between SDG 9 and the development and implementation of eco-industrial parks. It is acknowledged that further EIP assessments, research and statistical analysis are required to refine and validate these correlations, including a sensitivity analysis, expanding the pool of industrial parks in each country, their categorisation, and enhancing the consistency in determining the EIP scorings for each industrial park.

Table 3: Correlation between SDG 9 indicators and performance against International EIP Framework

Countries	Average current performance of parks against International EIP Framework (EIP scorings)	SDG indicators				
		9.2.1: Manufacturing value added as a proportion of GDP	9.2.1: Manufacturing value added per capita	9.2.2: Manufacturing employment as a proportion of total employment	9.4.1: CO ₂ emission per unit of value added	9.b.1: Proportion of medium and high-tech industry value added in total value added
Colombia	67.8%	10.8%	837	12.0%	0.36	22.8%
Egypt	56.9%	14.9%	425	12.0%	0.75	14.0%
Indonesia	67.5%	21.6%	928	14.1%	0.36	35.1%
Nigeria	53.9%	9.3%	223	7.9%	0.16	33.4%
Peru	45.7%	12.8%	811	9.2%	0.31	15.9%
South Africa	54.6%	12.2%	912	11.0%	0.85	24.4%
Ukraine	40.9%	10.7%	319	12.4%	2.80	30.4%
Viet Nam	63.2%	17.5%	339	17.4%	2.34	37.8%
Pearson correlation coefficient (r) of SDG 9 indicators and performance against International EIP Framework						
		0.54	0.34	0.48	-0.34	0.27
		Relatively strong correlation	Moderate correlation	Relatively strong correlation	Moderate correlation	Moderate correlation



Figure 10: SDG indicator 9.2.1 - Manufacturing value added as a proportion of GDP

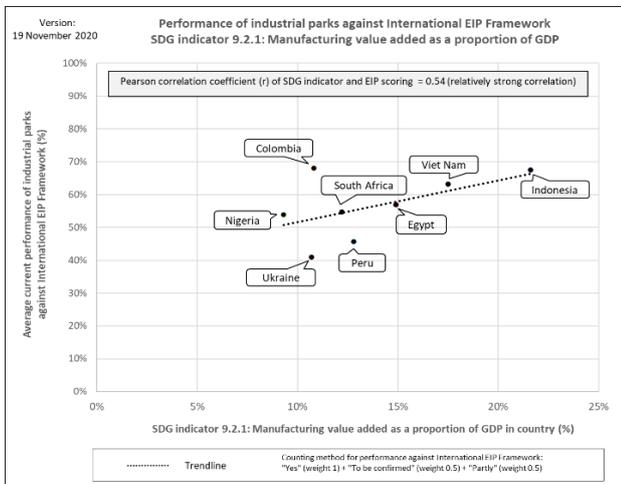


Figure 11: SDG indicator 9.2.1: Manufacturing value added as a proportion per capita

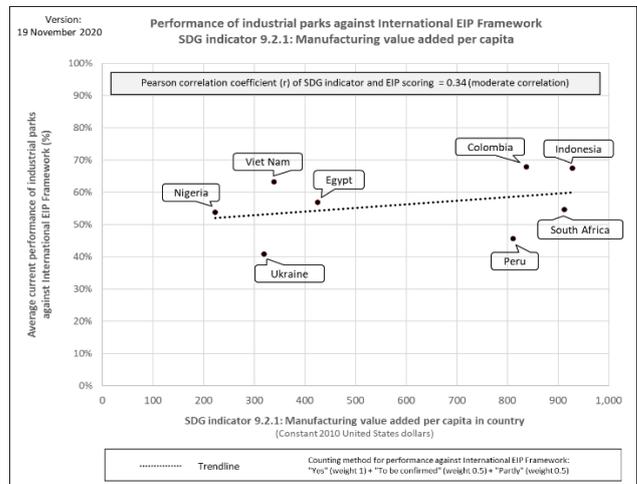


Figure 12: SDG indicator 9.2.2 - Manufacturing employment as a proportion of total employment

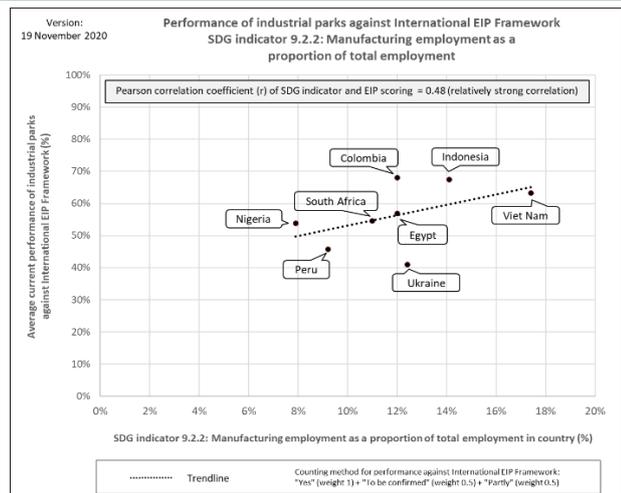


Figure 13: SDG indicator 9.4.1 - CO₂ emission per unit of value added

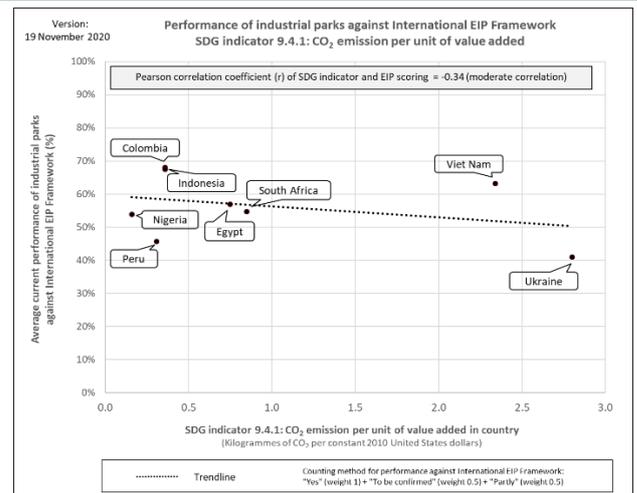
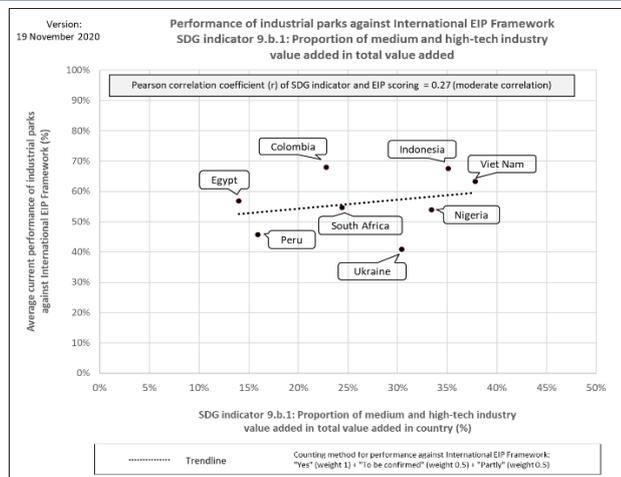


Figure 14: SDG indicator 9.b.1: Proportion of medium and high-tech industry value added in total value added





5.3 LESSONS LEARNT AND TAKE HOME MESSAGES

The key lessons learnt and take home messages on the contribution of eco-industrial parks to SDG 9 indicators based on the analysis undertaken and discussion in this chapter are:

- » There seems a relatively strong correlation between the performance of parks against the International EIP Framework (EIP scoring) and the following SDG indicators:
 - SDG indicator 9.2.1: Manufacturing value added as a proportion of GDP;
 - SDG indicator 9.2.2: Manufacturing employment as a proportion of total employment.
- » There seems a moderate correlation between the performance of parks against the International EIP Framework (EIP scoring) and the following SDG indicators:
 - SDG indicator 9.2.1: Manufacturing value added per capita;
 - SDG indicator 9.4.1: CO₂ emission per unit of value added;
 - SDG indicator 9.b.1: Proportion of medium and high-tech industry value added in total value added.
- » Overall, the analysis indicates a likely correlation between total EIP scorings of industrial parks and selected SDG 9 indicators. This positions eco-industrial parks as a practical and sound approach to support countries with meeting their SDG 9 goals through sustainable and inclusive industrial development;
- » The results indicate that the transformation of conventional industrial parks towards eco-industrial parks can positively influence a country's performance on key indicators of SDG 9 on Industry, Innovation, and Infrastructures across continents and levels of economic development of the country. It is recognised that the influence will be relative to the contributions to GDP of industrial parks in a given country;
- » EIP practices promote human and community well-being beyond the SDG 9 indicators through other economic development as well as environmental, social and gender related Sustainable Development Goals. Promoting EIP is a multi-faceted and practical means for the global community to take action for "better and more sustainable future for all";
- » The understanding of the correlation between the performance of parks against the International EIP Framework and the SDG 9 indicators will be strengthened by increasing the number of EIP assessments of industrial parks in the eight countries and subsequent further research. Further analysis could include the correlation of EIP performance with other SDGs (e.g. SDG 6 (Clean Water and Sanitation), SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action)).

Conclusions and
recommendations

6





6 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

The conclusions from the analysis on the assessments of industrial parks of their performance against the International Framework for Eco-Industrial Parks (UNIDO, WBG, GIZ, 2017) are:

- » *Analysis of prerequisites and performance indicators of International EIP Framework:* The analysis of the EIP prerequisites and performance indicators illustrates that the International EIP Framework can be regarded as a practical and relevant means to assess the EIP performance of an industrial park. The 50 industrial parks in eight countries assessed to date have an overall compliance of 57% against all prerequisites and performance indicators outlined in the International EIP Framework. 21 prerequisites and performance indicators had a compliance lower than 50% across all industrial parks assessed to date. A review of the root-causes illustrates that the main compliance issue for 16 prerequisites and performance indicators seems with the industrial parks and country specific conditions. Further, there is an opportunity to refine the formulation of five EIP prerequisites and indicators outlined in the current version (December 2017) of the International EIP Framework;
- » *EIP scorings of 50 industrial parks in eight countries:* There is a wide range in the performance of industrial parks against the International EIP Framework. Higher average current performance against the International Framework can be found in Colombia (68%), Indonesia (67%) and Viet Nam (63%). The highest average improvement potential is in Ukraine (27% improvement potential) and South Africa (25% improvement potential). It is noted that the results of the analysis may include some margin of variability as the EIP assessments were conducted by multiple experts. However, given the significant number of industrial parks assessed (50) and the use of the standardised rating options in UNIDO's EIP Assessment Tool (i.e. "Yes, No, Partly, To be confirmed"), the statistical error is somehow mitigated;
- » *EIP scoring of lighthouse park in GEIPP countries:* The lighthouse parks selected in the GEIPP countries with the highest current and intended performance against the International EIP Framework can be found in Indonesia and South Africa. Having a high performing lighthouse industrial park in a country seems to imply that there is at least capacity in the country to develop an eco-industrial park. In this scenario, technical assistance should include a stronger focus on knowledge dissemination, sharing experiences and peer-to-peer learning between industrial parks;
- » *EIP scoring by type of park management entity:* Industrial parks managed by Public Private Partnerships and the private sector show a higher average EIP scoring than parks managed by the public sector. Overall, this seems to illustrate that industrial parks perform better if they are run like a private business, rather than government-managed initiatives;
- » *Contribution of EIPs to SDG 9:* Overall, there seems a correlation between total EIP scorings of industrial parks and SDG 9 indicators. This positions Eco-Industrial Parks as a practical and sound approach to support countries with meeting their SDG 9 goals through sustainable and inclusive industrial development. The analysis presented in this report serves as a starting point for studying the correlation between SDG 9 and the development and implementation of eco-industrial parks.



6.2 RECOMMENDATIONS

Recommendation for the International Framework for Eco-Industrial Parks (UNIDO, WBG, GIZ, 2017):

- » UNIDO, WBG and GIZ to consider and follow-up on the prerequisites and performance indicators recommended for modification in a next revision of the International EIP Framework (as indicated in Chapter 3).

Recommendations for technical assistance provided through UNIDO and the Global Eco-Industrial Parks Programme:

- » The EIP assessments undertaken with 50 industrial parks to date provide insights into the technical assistance needs at country-level to transform conventional industrial parks into eco-industrial parks. Low compliance levels with specific prerequisites and performance indicators illustrate a higher need for support to the parks in the respective countries. It is therefore recommended that UNIDO's GEIPP team analyse the EIP assessment results in countries' context to formulate customised approaches for technical assistance to the parks and guide the planning and implementation of country-level GEIPP activities;
- » Business-oriented approaches should be promoted and embedded with parks managed solely by the public sector. Examples include streamlined decision making processes within park management without unnecessary government bureaucracies, park management services which meet the needs of resident firms, and addressing key common challenges facing tenant firms (e.g. secure water and energy supply, shared utilities and infrastructures);
- » The analysis of the number of "To be confirmed" ratings of the 51 prerequisites and performance indicators of the International EIP Framework highlights the need for park management and tenant firms to extend their data collection systems. The improvement of existing data collection systems and subsequent use for decision making is a recommendation, also with regards to the type of technical assistance which is provided as part of the GEIPP.

Recommendations for further analysis and research:

- » Extend research and analysis into the root-causes of the differences and similarities of the EIP scorings at industrial park and country levels (e.g. sampling, policy and regulations, access-to-finance, human and technical capabilities, local and national conditions) (see Chapter 4 for details);
- » Analysis of the EIP country-level scorings in order to advise on action areas and entry-points to be addressed in GEIPP countries;
- » Undertake further research and statistical analysis to refine and validate the correlation between EIP performances of industrial parks and SDG 9 (as indicated in Chapter 5), as well as with other SDGs such as SDG 6 (Clean Water and Sanitation), SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action).

Annex A

Analysis of International EIP
Framework – Technical details



ANNEX A: ANALYSIS OF INTERNATIONAL EIP FRAMEWORK – TECHNICAL DETAILS

ANALYSIS OF PRACTICALITY

Scope of analysis and formula

The analysis of the practicality of the 51 prerequisites and performance indicators outlined in the International EIP Framework focuses on which and how many prerequisites and performance indicators were rated as “To be confirmed”. A high proportion of “To be confirmed” ratings illustrates that prerequisite / indicator may not be very practical as data is mostly not available to validate its performance.

The formula to calculate the proportion of applicable prerequisites and indicators which do not have “To be confirmed” as a rating has been defined as follows:

- » Practicality % = (Counts "Yes", "No", "Party") / (Total number of responses - Counts "Not applicable").

Results from analysis

Applying the practicality formula outlined above to all ratings of the EIP assessments undertaken to date indicates that all prerequisites and indicators in the International EIP Framework have an overall practicality of 81%. This means that 19% of all ratings given to applicable prerequisites and performance indicators were “To be confirmed”. Overall, this shows that the International EIP Framework can be regarded as a practical means to assess the EIP performance of an industrial park.

Based on all EIP assessments of the parks in the eight countries, five EIP performance indicators had a practicality lower than 60%, meaning that over 40% of the ratings given for these indicators were rated as “To be confirmed”. These five indicators are:

- » At least 75% of all firms in industrial park with more than 250 employees have a harassment prevention and response system in place (55% practicality);
- » At least 80% of the surveyed employees report satisfaction with social infrastructure (37% practicality);
- » At least 20% of female workforce benefit from available supporting infrastructure/programs for skills development (56% practicality);
- » At least 80% of surveyed community members are satisfied with the community dialogue (47% practicality);
- » At least 25% of resident firms use local suppliers or service providers for at least 80 percent of their total procurement value (46% practicality).

It is noted that four out of these five indicators listed above are in the “social performance” category of the International EIP Framework. This indicates that a large proportion of the assessed parks do not yet extend their data collection systems to community outreach (e.g. periodic surveys with communities are not done) and/or parks do not have implementation mechanisms in place to undertake community dialogues. This highlights an opportunity for UNIDO to provide technical assistance to park management entities on the deployment of surveys inside and outside the park premises as well as supporting the implementation of community outreach activities. In this way, the number of “To be confirmed” ratings for these indicators would be lowered in future EIP assessments.



ANALYSIS OF RELEVANCE

Scope of analysis and formula

The analysis of the relevance of the prerequisites and performance indicators outlined in the International EIP Framework focuses on which and how many prerequisites and performance indicators were rated as “Not applicable”. A high proportion of prerequisites / indicators rated as “Not applicable” ratings illustrates their lesser relevance to the industrial parks being assessed.

The formula to calculate the proportion of prerequisites and indicators which do not have “Not applicable” as a rating has been defined as follows:

- » $\text{Relevance \%} = 1 - (\text{Counts "Not applicable"} / \text{Total number of responses})$.

Results from analysis

Applying the relevance formula outlined above to all ratings of the EIP assessments undertaken by UNIDO to date illustrates that the prerequisites and indicators in the International EIP Framework have an overall relevance of 98%. This means that only 2% of all ratings given to prerequisites and indicators were rated as “Not applicable”. A key finding from this analysis is that almost all prerequisites and performance indicators outlined in the International EIP Framework are relevant to the industrial parks in developing and transition countries.

There is only one prerequisite which has a relevance lower than 70%, namely:

- » Park management entity has plans to generate specific numbers and types of jobs (including diversity and inclusiveness) in line with government targets (66% relevance).

This finding provides an option to strengthen the formulation of this specific prerequisite in the International EIP Framework to make it more relevant to all industrial parks. In fact, in some countries, there are no government targets for employment and therefore this indicator cannot be applied as it stands.

ANALYSIS OF COMPLIANCE LEVELS

Scope of analysis and formula

The analysis of the compliance focuses on which and how many prerequisites and performance indicators were rated as “Yes”. A “Yes” rating implies full compliance with a specific prerequisite and performance indicator as defined in the current version of the International EIP Framework.

The formula to calculate the proportion of applicable prerequisites and performance indicators which are fully met by industrial parks has been defined as follows:

- » $\text{Compliance \%} = \text{Counts "Yes"} / (\text{Total number of responses} - \text{Counts "Not applicable"})$.

Results from analysis

Applying the compliance formula outlined above to all ratings of the EIP assessments undertaken to date illustrates that the prerequisites and performance indicators in the International EIP Framework have an overall compliance of 57%. Overall, this means that the industrial parks do not or will not fully meet 43% of applicable prerequisites and performance indicators. Further analysis on the differences and similarities of the EIP scorings of the 50 parks in the eight countries is provided in Chapter 4 of this report.



Based on the EIP assessments of all assessed parks in eight countries, the following eight prerequisites and indicators have a compliance lower than 30%:

- » An industrial heat recovery strategy is in place to investigate opportunities for heat and energy recovery for the major energy-consuming firms in the park (13% compliance);
- » A program is established to monitor, mitigate and/or minimize GHG emissions, such as carbon dioxide (CO₂), methane (CH₄), nitrogen oxide (NO_x), and so on (27% compliance);
- » Park management entity sets and works toward ambitious (beyond industry norms) maximum carbon intensity targets (maximum kilograms of carbon dioxide equivalent (kg CO₂-eq) / kilowatt hour (kWh) for the park and its residents (8% compliance);
- » Park management entity sets and works toward ambitious maximum energy intensity targets per production unit (kWh/\$ turnover) for the park and its residents (4% compliance);
- » At least 50% of total industrial wastewater from firms in the park is reused responsibly within or outside the industrial park (17% compliance);
- » Less than 50% of wastes generated by firms in the industrial park goes to landfills (28% compliance);
- » At least 80% of the surveyed employees report satisfaction with social infrastructure (29% compliance);
- » At least 80% of surveyed community members are satisfied with the community dialogue (27% compliance).

21 prerequisites and performance indicators had a compliance lower than 50% calculated across all 50 parks assessed. A review was made of root-causes of these 21 prerequisites / indicators (i.e. is compliance issue with industrial park / country specific conditions or is there a potential need to modify the EIP prerequisite or performance indicator). The results of this review are presented in the following table, including comments to reflect on the results.

Table 4: Review of root-causes of the 21 prerequisites / indicators with a compliance lower than 50%

International EIP Framework Category	EIP prerequisites and performance indicators	Root-causes of low compliance with prerequisites / performance indicators		
		At least 7 out of 8 countries have compliance ≤ 50%:	At least 2 out of 8 countries have compliance ≥ 50%:	Comments
		Consider to modify prerequisite / indicator	Compliance seems mainly with industrial park / country - specific conditions	
Park management	Where required, Park management has a plan in place to react to possible negative impacts due to climate change risks (heat waves and droughts, storms and floodwater events).		X	This is a binary prerequisite which should not be edited to increase compliance levels. It is important for EIPs to address this issue.
	At least every 6 months, park management entity monitors and prepares consolidated reports regarding the achievement of target values (as documented in this framework) to encompass the following: environmental performance; social performance; economic performance; and critical risk management at the level of the park.	X		Many parks assessed do not report periodically on their sustainability performance. It could be argued that the reporting frequency of 6 months should be changed to annually.
Environmental performance	Park management entity operates an environmental / energy management system in line with internationally certified standards, monitoring park performance and supporting resident firms in the maintenance of their own firm-level management systems.		X	This is a binary prerequisite which should not be edited to increase compliance levels. It is important for EIPs to address this issue.

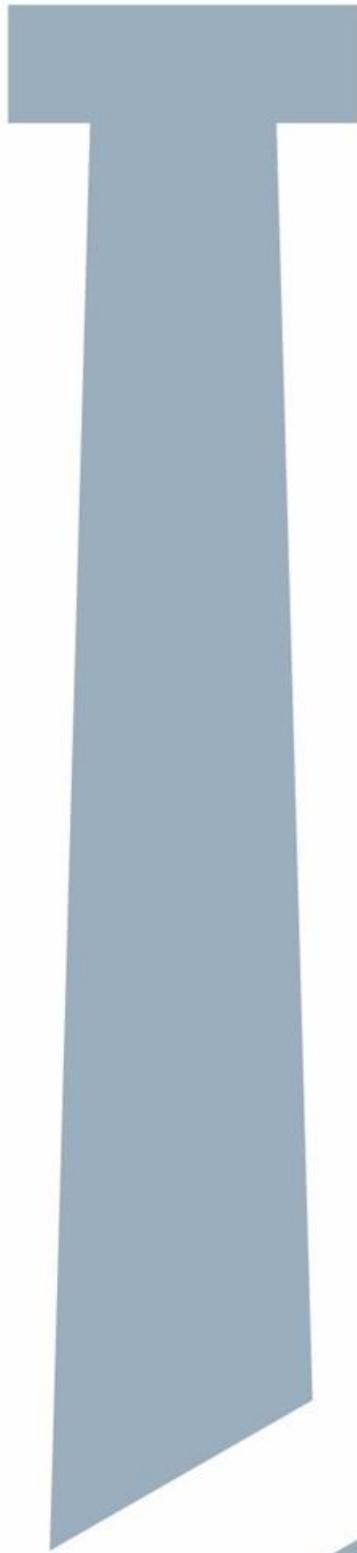
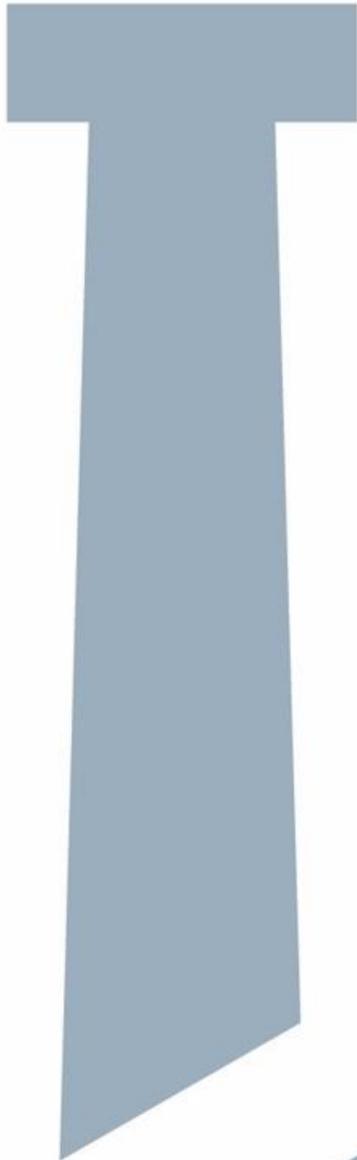


International EIP Framework Category	EIP prerequisites and performance indicators	Root-causes of low compliance with prerequisites / performance indicators		
		At least 7 out of 8 countries have compliance ≤ 50%:	At least 2 out of 8 countries have compliance ≥ 50%:	Comments
		Consider to modify prerequisite / indicator	Compliance seems mainly with industrial park / country - specific conditions	
	Supporting programs and documents are in place to improve the energy efficiency of resident firms, especially for the top 50 percent of major energy-consuming businesses in the park.		X	This is a binary prerequisite which should not be edited to increase compliance levels. It is important for EIPs to address this issue.
	An industrial heat recovery strategy is in place to investigate opportunities for heat and energy recovery for the major energy-consuming firms in the park.	X		Prerequisite is mostly relevant to very advanced industrial parks which have energy intensive heat streams. Heat recovery is mainly done at company level, rather than at park level. Prerequisite seems less relevant to industrial parks in warmer climates.
	Park management entity has demonstrable plans and (preferably) prior documented evidence to increase water reuse in the short and medium term. This would be achieved by either reuse of industrial effluents, or by rainwater/storm water collection.		X	This is a binary prerequisite which should not be edited to increase compliance levels. It is important for EIPs to address this issue.
	A program is established to monitor, mitigate and/or minimize GHG emissions, such as carbon dioxide (CO ₂), methane (CH ₄), nitrogen oxide (NO _x), and so on.		X	This is a binary prerequisite which should not be edited to increase compliance levels. It is important for EIPs to address this issue.
	The park management entity has a plan in place to assess operational environmental impacts, and aims to limit the impact on prioritised local ecosystem services.		X	This is a binary prerequisite which should not be edited to increase compliance levels. It is important for EIPs to address this issue.
	Park management entity sets and works toward ambitious (beyond industry norms) maximum carbon intensity targets (maximum kilograms of carbon dioxide equivalent (kg CO ₂ -eq) / kilowatt hour (kWh) for the park and its residents.	X		These two performance indicators are too ambitious for many industrial parks. It is very difficult to obtain a meaningful data series over a time period to measure progress on this indicator. The number and types of companies in industrial park is not a constant factor. It will be very challenging to collect data to calculate indicators consistently and reliably.
	Park management entity sets and works toward ambitious maximum energy intensity targets per production unit (kWh/\$ turnover) for the park and its residents.	X		
	At least 50% of total industrial wastewater from firms in the park is reused responsibly within or outside the industrial park.	X		This performance level of this indicator seems too stringent for most industrial parks.
	At least 20% of solid waste generated by firms is reused by other firms, neighbouring communities, or municipalities.		X	Although this performance indicator could be clearer defined (e.g. distinguish between water reuse and recycling), it is important for EIPs to address this issue.
	Less than 50% of wastes generated by firms in the industrial park goes to landfills.		X	Although this performance indicator could be clearer defined (e.g. indicator to cover both landfilling and waste burning without proper incineration infrastructure), it is important for EIPs to address this issue.



International EIP Framework Category	EIP prerequisites and performance indicators	Root-causes of low compliance with prerequisites / performance indicators		
		At least 7 out of 8 countries have compliance ≤ 50%:	At least 2 out of 8 countries have compliance ≥ 50%:	Comments
		Consider to modify prerequisite / indicator	Compliance seems mainly with industrial park / country - specific conditions	
	At least 50% of firms in park have pollution prevention and emission reduction strategies to reduce the intensity and mass flow of pollution/emission release beyond national regulations.		X	Although the formulation of this performance indicator is relatively complex, it is important for EIPs to address this issue, although the 'beyond national regulations' reduces drastically its applicability.
Social performance	At least 75% of all firms in the industrial park with more than 250 employees have a harassment prevention and response system in place.		X	Low compliance levels across these social indicators may indicate that a large proportion of the assessed parks do not yet have the implementation mechanisms, data collection systems on OH&S and human resources, confidence and/or capabilities to undertake the community outreach and dialogues.
	At least 80% of the surveyed employees report satisfaction with social infrastructure		X	
	At least 20% of female workforce benefit from available supporting infrastructure/programs for skills development.		X	
	At least 80% of surveyed community members are satisfied with the community dialogue.		X	
	At least two outreach activities that are implemented by the park management entity annually are regarded as positive by over 80 percent of the surveyed community members.		X	
Economic performance	A market demand and feasibility study, supported by a business plan, for specific "green" infrastructure and service offerings has been undertaken to justify planning and implementation in the industrial park.		X	Although the formulation of this performance indicator is relatively complex, it is important for EIPs to address this issue.
	At least 25% of resident firms use local suppliers or service providers for at least 80 percent of their total procurement value.	X	X	This indicator is naturally linked to the sectors/products of the specific park under analysis. Further, a main issue with this indicator seems with the data compilation by tenant companies and park management.





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