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INDICATORS TO MEASURE PERFORMANCE OF ECO-INDUSTRIAL PARKS IN VIETNAM

Final Report



GEIPP

VIET NAM GLOBAL ECO-INDUSTRIAL PARKS PROGRAMME



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List of acronyms

EIP	Eco-Industrial Park
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Corporation for International Cooperation)
ICOR	Incremental Capital Outputs Ratio
IF	International Framework
IFC	International Finance Corporation
IP	Industrial Park
IS	Industrial symbiosis.
NDC	Nationally Determined Contribution
MPI	Ministry of Planning and Investment
RECP	Resource Efficiency and Cleaner Production
PBI	Performance-based Incentives
PM	Park Management
PP	Pollution Prevention
SCP	Sustainable Consumption and Production
SDG	Sustainable Development Goals
SECO	State Secretariat for Economic Affairs of the Government of Switzerland
UNIDO	United Nations Industrial Development Organization
UNDP	United Nations Development Programs

Executive summary

This report provides recommendations for a national set of indicators to monitor the performance of eco-industrial park development in Vietnam w.r.t. environment, park management, and social and economic aspects. It illustrates how the initial list of indicators was identified, how a shortlist was created, the results from the measurement of the shortlisted indicators at selected IPs. In addition to a list of recommended indicators, this report recommends an EIP index, based on the indicators, which can be used to communicate the performance of an industrial park in a simplified manner. As an outcome of this assignment, a set of 23 indicators for the environment, park management, and social and economic aspect were suggested and assessments were conducted for several surveyed IPs against those indicators. The results show that not all indicators were met by the surveyed IPs even though the ability of these IPs to apply those indicators is considerably high.

Vietnam just started the EIP development, and the government has a strong commitment to supporting this process. However, there is a gap in policy as well as a lack of financial incentives to accelerate the process, particularly to transform conventional IPs into EIPs. There has been addressed through several recommendations covered under environmental, park management, economic and social topics.

An introduction to the EIP index and how to move ahead in applying this index for monitoring IP performance toward EIP might be a useful tool in the implementation of Decree 35/ND-CP/2021.

EIP development in Vietnam is at the piloting stage and we must ensure that this stage should be done smoothly while sufficient consideration would be given to the findings from EIP-related assessments including those carried out in this assignment.

The report is organized as follows:

- » Chapter 1: provides a brief introduction to the project.
- » Chapter 2: presents the selection process for indicators. The process includes a screening of indicators from a long list of indicators followed by developing a questionnaire and conducting surveys. The result of the survey is synthesized into a set of suggested indicators for the environment, park management, social and economic aspect of the EIPs.
- » Chapter 3: presents an introduction to the EIP index calculation and how it was deployed for the assessment of IP performance. The assessment is conducted based on the result of the survey to test the consistency of the selected indicators.
- » Chapter 4: presents an example of EIP index calculation for EIP benchmarking and provides a suggestion for EIP index thresholds in three levels: gold, silver, and bronze.

- » Chapter 5: presents an assessment w.r.t: the ability of surveyed IPs to meet the 3 EIP criteria (on RECP, industrial symbiosis, and shared infrastructure) regulated by Decree 35. It also evaluates the ability to apply the EIP index and related indicators.
- » Chapter 6: summarizes a set of recommendations on how the assessed EIP indicators can be used for the improvement of the company's performance. It is done by linking the suggested indicators to existing or future regulations/ financial incentives.

1. Background

Inclusive and sustainable industrial development has become a necessity due to a pressing need to balance economic, social, and environmental goals. Eco-industrial parks (EIPs) promote sustainability in industrial zones. The EIP approach offers industrial park-wide solutions instead of product- or firm-specific interventions. It not only involves changes at the firm level or park level but also local communities and nations at large can benefit from environmental, social, and economic improvements .

From 2014 to 2019, the project “Implementation of eco-industrial park initiative for sustainable industrial zones in Viet Nam” was implemented by UNIDO in collaboration with MPI, and with the financial support of GEF, SECO and UNDP. The project aims to develop policies and guidelines to facilitate the transformation of industrial zones into EIPs. To achieve this goal, the EIP principles are applied in four existing industrial zones in the provinces of Da Nang (Hoa Khanh IZ), Can Tho (Tra Noc 1 and 2 IZs), and Ninh Binh (Khanh Phu IZ and Gian Khau IZ), which served as a pilot implementation. This effort is expected to subsequently support replication and upscaling across Viet Nam. As a continuation of the successful implementation of this project, the project “Eco-industrial park intervention in Vietnam -Perspective from Global Eco-industrial Park Program”, funded by SECO, was launched in November 2020. Among other things, the project supports the development of policies for EIP and continues to promote the deployment of eco-industrial park solutions in several industrial parks.

As part of the project, three industrial parks, including two “model” industrial parks (Amata and Deep C industrial parks) and one industrial park with significant improvement potential (Hiep Phuoc IP), were selected as pilot IPs to be transformed into EIPs through different interventions, including RECP assessments and identification of opportunities for industrial synergies.

2. Process for indicators selection

To support the development of EIP in Vietnam, a monitoring, reporting and verification mechanism should be put in place and a set of indicators that is suitable to the Vietnamese context is needed for this purpose. The selection process for national indicators was done by conducting survey research at selected industrial parks (Deep C IP in Hai Phong, Amata IP in Dong Nai, Hiep Phuoc IP in HCMC, and Hoa Khanh IP in Da Nang). The methodology employed in this assessment is illustrated in the following diagram (Figure 1).

¹ https://www.e3s-conferences.org/articles/e3sconf/pdf/2021/34/e3sconf_uesf2021_03002.pdf p.1

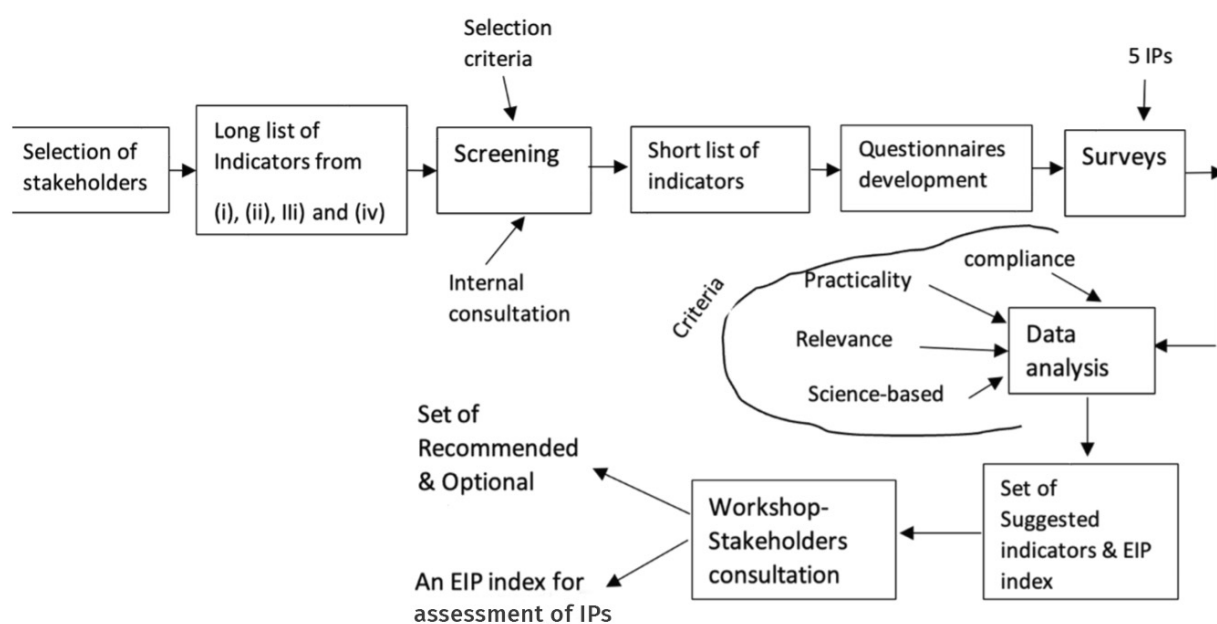


Figure 1. Process for selection of indicators

2.1 Methodology for selection of indicators

The selection of indicators was done through the following steps:

Step1:

Indicators for environmental, park management, social and economic aspects were identified from the following sources:

- » The EIP International Framework version 2
- » Revised Decree 82 on EIP management or recently issued Decree 35/2022/ NĐ-CP
- » Decision 681/QĐ-TTg/2019, which stipulates a roadmap for the implementation of Vietnam SDG toward 2030
- » Eco-Industrial parks Vietnam – Social and Economic indicators for Eco-industrial parks in Viet Nam developed by UNIDO and MPI

Step 2:

An excel file was developed to facilitate the process of indicators selection. For each indicator, the following information was collected:

- » Relevant EIP topic
- » Indicator description
- » Performance/Prerequisites indicators

² UNIDO, MPI (2019). ECO-Industrial parks Vietnam – Social and Economic indicator for Eco-industrial parks in Việt Nam.

- » Target value unit
- » Source of the indicator (from the sources described in 2.1)
- » Scope of application (Park or enterprise-level)
- » Criteria for indicator selection (see Step 3 below)
- » Score
- » Methodology for data collection

The contents include a description of indicators as well as data sources, level of application and methodology for data collection. The criteria were set for both qualitative and quantitative indicators as described in Step 3 below.

Step 3: Selection of quantitative and qualitative indicators

Different methods were used to screen relevant quantitative and qualitative indicators.

Quantitative indicators:

Relevant indicators (based on Step 2, and extracted from i, ii, iii and iv) were evaluated based on the following criteria:

- a. Data availability/accessibility (*Yes, no*)
- b. Is it easy to attain (*Easy, not easy*)
- c. *Does the target have a potential for change in the future (is it realistic)? (High, low)*
- d. *Are there barriers to applying the indicator (Yes, no)*

A weight was assigned to each criterion. Then, those selection criteria were further sub-categorized, and values were assigned based on their importance for data collection and monitoring of indicators.

Qualitative indicators:

Relevant indicators were evaluated based on the following selection criteria:

- a. Data availability/accessibility (*Yes, no*)
- b. *Relevance (High, low)*

A weight was assigned to each criterion. Then, those selection criteria were further sub-categorized, and values were assigned based on their importance for data collection and monitoring of indicators.

2.2 Introduction of indicators

Based on the experts' shortlist of indicators and after several rounds of consultations with UNIDO and MPI experts, the most relevant indicators were selected. These indicators were deployed for drafting a questionnaire to be used for interviews in parts 2.3 and 2.4 below. A list of those indicators is detailed in Appendix 1, which includes:

2.2.1 Environmental indicators

35 indicators categorized into 6 main topics:

- » Resources efficiency and cleaner production (RECP), Industrial symbiosis (IS)
- » Energy
- » Water supply and wastewater
- » Wastes and material use
- » Natural environment and climate resilience
- » Management and monitoring

2.2.2 Park management indicators

20 Indicators categorized into 4 main topics:

- » Park management services
- » Risks monitoring and management
- » Planning and Zoning
- » Support from local government

2.2.3 Social indicators

19 social indicators in 3 main topics:

- » Social Management System,
- » The social infrastructure of the IP,
- » Community outreach.

2.2.4 Economic indicators

27 economic indicators in 5 main topics:

- » Economic value added or economic value creation
- » Industrial Symbiosis
- » Employment generation
- » Local business and SME promotion
- » IP's financial viability

2.3 Development of questionnaire

From the selected indicators, three sets of questionnaires were developed to make the criteria suitable for the respective stakeholders, which are:

- » Park management authority,
- » Industrial Park's infrastructure developer (IP developer) and
- » Tenant firms.

The questionnaires were developed in consultation with experts from UNID and MPI. They are also developed based on the inputs provided by stakeholders during several face-to-face interviews at trial tests and the execution phase during an on-site mission. The process is completed in the following manner:

- » Firstly, the questionnaires were drafted by national experts on environmental, social and economic development.
- » They were further reviewed by UNIDO and MPI to create a first version that can be used for the first trial phase at one industrial park (Deep C).
- » The questionnaires were tested in Deep C industrial park with the participation of the Hai Phong industrial park management authority, the Deep C industrial park developer and 2 tenant firms.
- » Following the trial test, the questionnaires were reviewed and adjusted to create a version that is ready for data collection during the on-site missions.
- » During the face-to-face interviews, the questionnaires were further adjusted based on comments received from the interviewees.

2.4 Method for data collection

The questionnaires were launched in Word and online Google forms to facilitate respondents in completing the questionnaires both offline and online.

The interviews conducted from March to May 2022 are listed as follows:

- » The face-to-face interview was conducted in Ho Chi Minh City (Hiep Phuoc IP), Dong Nai Province (Amata), Da Nang city (Hoa Khanh IP) and Hai Phong city (Deep C)
- » The online interview was conducted for Can Tho (Tra Noc 1 and 2) and Khanh Phu IP (Ninh Binh Province)

The detailed list of the stakeholders interviewed is in *Appendix 3*.

2.5 Data analysis and selection of indicators

2.5.1 Criteria for data analysis

In addition to measuring the actual EIP indicator, the data collection was also aimed at assessing the following criteria for each EIP indicator:

- a. Practicality
- b. Compliance
- c. Relevance
- d. Scientific basis

2.5.2 Analysis of practicality

The analysis of the practicality of the indicators focuses on which indicators could be measured by respondents. For example, it identifies the availability of the information to measure the indicator. In other words, the judgement is made based on the number of responses “to be confirmed” or “data not available” over total responses.

A high proportion of “Yes” and “No” ratings (i.e., the indicator could be measured) indicates that the indicator is “practical” as data is available to validate its performance.

Similarly, a high proportion of “To be confirmed” and similar responses illustrate that the indicator may not be very practical. It is likely caused by the unavailability of data required to validate the performance.

The formula to calculate the practicality is defined as follows:

$$\text{Practicality \%} = (\text{Counts "Yes" and "No"}) / (\text{Total number of responses})$$

2.5.3 Analysis of Compliance

The analysis of the compliance of the indicators focuses on which indicators were rated as “Yes” in the main and sub-questions. A high proportion of indicators rated as “Yes” will imply that the assessed industrial parks find the indicator easy to comply with. Conversely, the indicator with a very low compliance rate will be considered unsuitable for Vietnam since it might suggest that the indicator is too demanding or incompatible with the Vietnamese context.

The formula to calculate the proportion of indicators was rated as “Yes” (in main and sub-questions) out of the total responses for that question, as follows:

$$\text{Relevance \%} = (\text{Total number of "Yes"} / \text{Total number of valid responses}).$$

2.5.4 Analysis of Compliance

- » The relevance is categorized into 3 levels: high, medium, and low, based on its relevance for EIP development considering the following points: Accordance with national legislation and international requirements: an indicator is relevant if it is needed to meet national and international requirements. However, it should not duplicate what is already required by existing Vietnamese regulations.
- » The benefits of the EIP concept: an indicator is relevant if it helps achieve important/fundamental aspects of the EIP concept, as outlined in the EIP International Framework.

2.5.5 Analysis of scientific basis

The analysis of scientific basis served to further evaluate the applicability of indicators i.e. if the methodology to be followed to measure the indicator and the description of the indicator is clear enough. For example, indicators that, based on their description, imply a high degree of subjectivity in their measurement, are considered not science-based.

2.5.6 Analysis of indicators

Specific thresholds have been introduced for the selection of indicators based on their calculation results of practicality ($\geq 70\%$), compliance ($\geq 50\%$) and other criteria indicated above. Details of calculations can be found in *Appendix 2*.

Table 1. Suggested indicators for environmental aspects

No.	Description of indicator	Threshold	Level of application	Adapted from	Recommended or Optional
1	Number of IS* realized in the IPs	1, and 1 additional every 3 years	IP developer	Decree 35	Recommended
2	Percentage of firms within IPs having RECP** implemented	20%, and 5% increase every 3 years.	Firms	Decree 35	Recommended
3	Percentage of industrial wastewater from firms that is reused within or outside the industrial park, in accordance with legal requirements	5% and 5% every 5 years, up to 25%	IP developer	EIP Int'l Framework	Recommended
4	A programme is established with clear evidence of steps taken to monitor and reduce emissions of (CO ₂), methane (CH ₄) and nitrogen oxides (NO _x)	Yes/No	IP developer	EIP Int'l Framework	Recommended
5	Park management entity has a mechanism for monitoring inputs and outputs of materials to and from the industrial park, including energy, water, chemicals, and raw materials. They summarize results achieved in RECP and emission control in annual reports to the IP management authority	Yes/No	IP developer	Decree 35	Recommended

6	Annually, the park management entity (and resident firms) publish reports on environmental protection and social responsibility towards employees and surrounding communities, to be then published on their websites	Yes/No	IP developer	Decree 35	Recommended for IP developers and optional for tenant firms
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*: **Industrial symbiosis** refers to cooperation between enterprises within an industrial park or with enterprises within various ones to optimize the use or reuse of input and output factors, such as raw materials, water, energy, waste, scrap, by-products, etc., during the manufacturing and business process.

: **RECP entails the continuous application of preventive environmental strategies to processes, products and services to increase efficiency and reduce risks to humans and the environment (UNIDO: <https://www.unido.org/our-focus-afeguarding-environment-resource-efficient-and-low-carbon-industrial-production/resource-efficient-and-cleaner-production-recp>)

Table 2. Suggested indicators for the park management aspect

No.	Description of indicator	Threshold	Level of application	Adapted from	Recommended or Optional
7	Park management entity maintains an EIP framework monitoring system in place, tracking and reporting: <ul style="list-style-type: none"> • Critical risk factors and related responses, at least for: o Risk points for the accidental release of hazardous solid, liquid and gaseous effluents, including during transportation and disposal when fire hazards are possible; 	Yes/No	IP developer	EIP Int'l Framework	Recommended (to be integrated into EIA)

³ According to World Business Council for Sustainable Development (WBCSD) definition “Corporate Social Responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local

	<ul style="list-style-type: none"> o Applicable natural disaster risks (for example, earthquakes); o Critical risk management at the level of the park • Acts as monitoring and pre-clearing institution for environmental issues on behalf of the regulatory bodies, as delegated 				
8	Park management has a plan in place, to be updated every seven years, to react to possible negative impacts due to climate change (e.g. heat waves and droughts, storms and floodwater events)	Yes/No	IP developer	EIP Int'l Framework	Recommended
9	The management entity of the industrial park shall assign a public non-business unit directly under the management board or an appropriate unit to perform the function of i) building and providing information in a database on resource efficient and cleaner production (RECP); ii) proposing solutions and connect enterprises to implement industrial symbiosis; iii) providing supporting services for transition or new construction of eco-industrial parks	Yes/No	IP developer	Decree 35	Recommended
10	IP developer are required to: register for investment attraction industries and trades; estimate emission loads for each industry; propose a plan for realization of industrial symbiosis, the plan for setting-up and implementation of a mechanism to monitor the inputs and outputs of the industrial park on the use of raw materials, materials, energy, water, chemicals and	Yes/No	IP developer	Decree 35 ⁴	Optional (Recommended for new EIPs)

⁴ This criteria applies to new EIP with focus on allocation of industries with purpose to facilitate IS realisation.

	the implementation plan of social responsibility towards employees and the surrounding community in the dossier of investment project on the infrastructure construction and business of the industrial park				
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Table 3. Suggested indicators for the social aspect

No.	Description of indicator	Threshold	Level of application	Adapted from	Recommended or Optional
11	Proportion of firms with more than 100 employees that have a code of conduct system in place to deal with grievances	75%	Firms	EIP Int'l Framework, Decree 35	Recommended
12	Proportion of firms that have a Disclosure and Accountability System fully operational	75%	Firms	Decree 35	Recommended
13	Essential primary social infrastructure is adequately provided in the site master plan and is fully operational in the park	Yes/No	IP developer	EIP Int'l Framework, Decree 35, UNIDO-MPI indicators	Recommended
14	Percentage of firms in the industrial park with more than 100 employees that incorporated gender perspectives in the formulation, management and monitoring of plans and programs, and provide social insurance, health insurance, medical check-ups, occupational safety training	75%	Firms	EIP Int'l Framework, UNIDO-MPI indicators	Recommended
15	Dedicated personnel exist as part of the park management entity to plan, manage and enforce social quality standards	Yes/No	IP developer	EIP Int'l Framework	Recommended
16	Proportion of firms with more than 100 employees that have a harassment prevention and response system in place	75%	Firms	EIP Int'l Framework	Recommended

17	The IP management entity maintains or increases annual spending towards local community engagement and dialogue	Yes/No	IP developer	UNIDO-MPI indicators	Optional
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Table 4. Suggested indicators for the economic aspect

No.	Description of indicator	Threshold	Level of application	Adapted from	Recommended or Optional
18	The park management entity has a plan with clear evidence to develop economic synergies across their tenant companies and thereby realize economies of scale and greater bargaining power in business transactions	Yes/No	IP developer	Decree 35	Recommended
19	The park management entity is responsible for marketing the park and the EIP concept to potential national and international investors	Yes/No	IP developer	EIP Int'l Framework	Recommended
20	The park management entity has a strategy in place to create job opportunities for people living within 100 km radius from the industrial park	Yes/No	IP developer	EIP Int'l Framework	Recommended
21	The park management entity allows and promotes the establishment of SMEs that provide services and add value to park residents	Yes/No	IP developer	EIP Int'l Framework	Recommended
22	The park management entity uses local suppliers whenever possible, and provides local business with opportunities to grow	Yes/No	IP developer	UNIDO-MPI indicators, EIP Int'l Framework	Optional
23	The industrial park renders its services at realistic costs to cover operational expenditures	Yes/No	P developer	EIP Int'l Framework	Recommended

3. EIP performance index for industrial parks

3.1 Calculation methodology

For demonstration, a methodology to calculate the EIP Index based on the assessment of a surveyed IP w.r.t is performed below. The calculation is carried out respectively on the environmental, park management, social, and economic aspects of the EIP.

The formula for the calculation of the EIP Index is:

$$EIP\ Index = \sum_{k=1}^n \frac{wk * i_k}{W}$$

where:

- i = value of the indicator (1 for 'indicator met' and 0 for 'indicator not met')
- w = weight assigned to the indicator, based on its relevance for EIP. This weight should not be changed to allow comparisons.
- W = sum of all weights of applicable park management, environmental, economic, or social indicators (for which information is available)

Based on the survey results, the IP's performance is evaluated against recommended indicators i.e. the indicator met or not, were assigned with values of 1 and 0 respectively. Besides, a weight is assigned for each indicator, based on its relevance for EIP, as follows:

- » 3 for prerequisite indicators (according to their original source)
- » 1 to 2 for performance indicators, depending on their importance for the EIP concept according to the International Framework for EIPs (the weight are assigned by the experts).
- » The weights should not be changed to allow comparison across industrial parks.

3.2 Example for the calculation of EIP index

Table 5. An example of calculation of the EIP index (for a surveyed IP)

Indicator n.	Is the indicator met by the IP?	Value (0 if not met, 1 if met)	Weight based on relevance for EIP (1-3)	EIP index
I. ENVIRONMENT				
1	No	0	2	0.00
2	No	0	2	
3	Yes	1	1	0.07

4	No	0	3	
5	Yes	1	3	0.21
6	Yes	1	3	0.21
		Subtotal		0.49
II. PARK MANAGEMENT				
7	No	0	3	0.00
8	Yes	1	3	0.25
9	Yes	1	3	0.25
10	Yes	1	3	0.25
		Subtotal		0.75
III. ECONOMIC				
11	Yes	1	3	0.18
12	Yes	1	3	0.18
13	Yes	1	3	0.18
14	Yes	1	3	0.18
15	No	0	2	0.00
16	Yes	1	3	0.18
		Subtotal		0.90
IV. SOCIAL				
17	Yes	1	2	0.11
18	Yes	1	3	0.16
19	Yes	1	3	0.16
20	Yes	1	3	0.16
21	Yes	1	3	0.16
22	Yes	1	2	0.11
23	No	0	3	0.00
		Subtotal		0.84
		Average (I, II, III and IV)		0.75 (75%)

4. Calculation of EIP index for benchmarking

To make the EIP index a useful tool for assessing the IP performance across the country, specific thresholds are suggested for benchmarking:

- » Gold EIP: meets all 23 recommended & optional indicators; EIP index is 1 (or 100%)
- » Silver EIP: meets all 20 recommended indicators; EIP index is 0.83 (or 83%)
- » Bronze EIP: meets 14 recommended indicators, including 7 indicators from Decree 35 and 7 indicators from the International Framework for EIPs, EIP index is 0.57.

5. Results of pilot testing of national EIP indicators

5.1 Assessment of the ability of the surveyed IPs to meet the 3 EIP criteria (on RECP, industrial symbiosis, and shared infrastructure) regulated by Decree 35

The assessment is done for three surveyed IPs and it is shown in the table below:

Table 6. Assessment of the ability of surveyed IPs to meet the 3 EIP criteria (on RECP, industrial symbiosis, and shared infrastructure) regulated by Decree 35

IPs	Met the criterion for IS ^(a)	Ability to meet the criterion in the future	Met the criterion for RECP ^(b)	Ability to meet the criterion in the future	Met the criterion for shared infrastructure ^(c)	Ability to meet the criterion in the future
IP No.1	No	High	No	Medium	Almost Yes (23.2% not including social infrastructure)	High
IP No.2	Yes	High	No	Medium	Yes	High
IP No.3	No	High	No	Medium	Yes	High

Note ^(a): At least one IS has been implemented in the IP

^(b): min 20% of tenant firms apply RECP solutions for saving resources.

^(c): at least 25% of land areas reserved for shared infrastructure which includes greenery, internal traffic, and technical and social infrastructure.

⁵ Full details on the results from the pilot testing can be found in the Baseline Report (UNIDO, 2022. Assessment of a country-specific set of EIP indicators and testing in selected industrial parks of Viet Nam)

The data from Table 7 shows that almost all three IPs met the criterion for shared infrastructure with an exception for IP No. 1 where the land areas for shared infrastructure count for 23.2% and it does not include land areas for social infrastructure (because there is no surveyed data calculated for essential social infrastructure). Hence, most likely that all three IPs can meet this criterion. On the opposite, at present, all three IPs do not meet the criterion for RECP and the ability to meet this criterion is medium. For the IS, only IP No.2 presently met this criterion.

However, according to recent preliminary findings from VNCPC, all three IPs can potentially meet this criterion.

5.2 Assessment of the ability to apply the EIP index and related indicators

To assess the ability of surveyed IPs to apply the IP index, we utilized the data gathered on suggested indicators related to the environment, park management, social, and economic aspects (See part III). The results of this assessment are shown in the table below:

Table 7. Assessment of the ability to apply the EIP index and related indicators in one assessed IP

I. ENVIRONMENTAL INDICATORS				
Indicator n.	Indicator met?	Ability to apply (High, Medium, Low)	Explanation	Recommendation/ Remarks
Number of IS* realized in the IPs	No	High For IP developer	There is only an IP met this indicator because Decree 35 with an introduction of IS is recently introduced in 2018). The ability to meet this indicator is high with reference to recent surveys findings from VNCPC	It requires a strong commitment and support from IP management authority once IS opportunity was identified and its detailed assessment was shown to be feasible. Tenant firms are mainly SME with limited resources for having IS realized → requires a technical and financial support
Percentage of firms within IPs having RECP** implemented	No	Medium For Firms	None of the IP met this indicator. RECP training was limited. To date number of RECP quick and detailed assessment is low. The situation would be improved	More RECP training is needed. RECP norms for resources consumption/intensity and RECP guidelines for specific industry sector must be developed and disseminated

			after RECP training were planned to conduct by VNCPC during implementation of this EIP project	
Percentage of industrial wastewater from firms that is reused within or outside the industrial park, in accordance with legal requirements	No	Medium For IP developer and firms	An IP met this indicator. The other IP almost met this indicator (12/17 firms) and an IP has only a firm reuses/ recycle their treated w.w) W.r.t reuse of treated w.w, there is no clear legal legislation and no economic incentive to support this	<p>Policy and the financial incentive are needed to stimulate water reuse/ recycling in IPs</p> <p>IP developer may provide incentives for tenant firm to reuse/recycle its w.w e.g., reduce fees for treatment of w.w. in WWTP if firm is succeeded in reuse/recycling certain % of its water.</p> <p>Government may grant a tax credit e.g., of up to 30 percent of the project value for purchasing, designing and installing systems that increase water recycling or the use of recycled water.</p> <p>The IP developer may develop a database to monitors this by having a data of water consumed by firms and its wastewater being sent to WWTP for treatment, as follows: reused water = total water consumed- drainage</p>
A programme is established with clear evidence of steps taken to monitor and reduce emissions of (CO ₂), methane (CH ₄) and nitrogen oxides (NO _x)	Yes	Low For IP developer	2/3 surveyed IPs does not meet this indicator. GHGs emission monitoring is not mandatory but is concentration in ambient air. Only from 2025 company will be required to have a roadmap for reduction of GHGs emission (Decree 06/2022/NĐ-CP on GHGs reduction and Ozone layer protection)	<p>At national level, it may grant tax credit and soft loan for purchasing, installing low carbon technology.</p> <p>IP should conduct GHGs inventory and monitor its GHG emission. It may start with major-energy consuming firm as required by Decree 25/2020/TT-BCT that it should have a plan for rational use and saving of energy.</p> <p>Increase share of RE (renewable energy) production and use in the IP.</p>

<p>Park management entity has a mechanism for monitoring inputs and outputs of materials to and from the industrial park, including energy, water, chemicals, and raw materials. They summarize results achieved in RECP and emission control in annual reports to the IP management authority</p>	<p>Almost Yes (2/3)</p>	<p>Medium For IP developer</p>	<p>The surveyed IPs met this indicator partly, mainly for water and energy</p>	<p>A database can be developed by using input/outputs data collected from questionnaire survey. The data should be validated by on-site visits and be updated regularly as the EIP is in constant evolution⁶</p>
<p>Annually, the park management entity (and resident firms) publish reports on environmental protection and social responsibility⁷ towards employees and surrounding communities, to be then published on their websites</p>	<p>Yes</p>	<p>Low For IP developer</p>	<p>The surveyed IPs met this indicator partly i.e., EPR and CSR reports have not yet been published into website</p>	<p>At this stage, the publishing of EPR and CSR report can be waived. The content of CRS report should be developed by a competent body as currently there is no common understanding of what CSR report should include</p>

⁶ UNIDO, Implementation handbook for EIP p.31

⁷ According to World Business Council for Sustainable Development (WBCSD) definition “Corporate Social Responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local

II. PARK MANAGEMENT

Park management services				
<p>Park management entity maintains an EIP framework monitoring system in place, tracking and reporting:</p> <ul style="list-style-type: none"> • Critical risk factors and related responses, at least for: <ul style="list-style-type: none"> ○ Risk points for the accidental release of hazardous solid, liquid and gaseous effluents, including during transportation and disposal when fire hazards are possible; ○ Applicable natural disaster risks (for example, earthquakes); ○ Critical risk management at the level of the park. • Acts as monitoring and pre-clearing institution for environmental issues on behalf of the regulatory bodies, as delegated. • Operates a central environment control unit with an emergency alert system for environmental and other hazards. 	No	Medium PM authority	At this stage none of the IP met this criterion as it's recently stipulated in the Decree 35	Relevant EIP training is needed for staff before being assigned/recruited in public non-business unit
<p>Park management has a plan in place, to be updated every seven years, to react to possible negative impacts due to climate change (e.g. heat waves and droughts, storms and floodwater events)</p>	Yes	Medium For IP developer	This for new EIP. Most of the surveyed IPs expressed their willing to support this	EIP concept planning needs to be introduced to relevant stakeholders (<i>UNIDO Tool</i>). Knowledge on international best practice for designing new EIP should be

				disseminated. In future a Guideline for designing of new EIP should be developed
The management entity of the industrial park shall assign a public non-business unit directly under the management board or an appropriate unit to perform the function of i) building and providing information in a database on resource efficient and cleaner production (RECP); ii) proposing solutions and connect enterprises to implement industrial symbiosis; iii) providing supporting services for transition or new construction of eco-industrial parks	Yes	Medium For IP developer	EIP is recently introduced. Most of the surveyed IPs expressed their willing to support this	This requires an existence of EIP framework monitoring system that is demanding for IP developer. There is a need to have capacity building for IP developer on this system
IP developer are required to: register for investment attraction industries and trades; estimate emission loads for each industry; propose a plan for realization of industrial symbiosis, the plan for setting-up and implementation of a mechanism to monitor the inputs and outputs of the industrial park on the use of raw materials, materials, energy, water, chemicals and the implementation plan of social responsibility towards employees and the surrounding community in the dossier of investment project on the infrastructure construction and business of the industrial park	Between Yes and No	High For IP developer	There is only an IP to meet this indicator but more than half of the firms having plans for climate change or parts of the plans. Hence, the ability for IP to meet this indicator is high	Guideline for developing an IP's plan for climate change should be developed to have a harmonized plan across the IPs

I. SOCIAL INDICATORS

Proportion of firms with more than 100 employees that have a code of conduct system in place to deal with grievances	Yes	High	Survey result is higher than target value	Rec.
Proportion of firms that have a Disclosure and Accountability System fully operational	No	Medium	Although the survey results are still low, the opinions are that they plan to do it in the next 2-3 years	Rec.
Essential primary social infrastructure is adequately provided in the site master plan and is fully operational in the park	Yes	High	Survey result is higher than target value	Rec.
Percentage of firms in the industrial park with more than 100 employees that incorporated gender perspectives in the formulation, management and monitoring of plans and programs, and provide social insurance, health insurance, medical check-ups, occupational safety training	Yes	High	Survey result is higher than target value	Rec.
Dedicated personnel exist as part of the park management entity to plan, manage and enforce social quality standards	Yes	High	Survey result is higher than target value	Rec.
Proportion of firms with more than 100 employees that have a harassment prevention and response system in place	Yes	High	Survey result is higher than target value	Rec.
The IP management entity maintains or increases annual spending towards local community engagement and dialogue	Yes	High	Survey result is higher than target value	Optional

II. ECONOMIC INDICATORS

The park management entity has a plan with clear evidence to develop economic synergies across their tenant companies and thereby realize economies of scale and greater bargaining power in business transactions	Yes	Medium	The practical level is high, and the compliance level is normal	
The park management entity is responsible for marketing the park and the EIP concept to potential national and international investors	Yes	High	The practicality and the compliance level are high	
The park management entity has a strategy in place to create job opportunities for people living within 100 km radius from the industrial park	Yes	High	The practicality and the compliance level are high	
The park management entity allows and promotes the establishment of SMEs that provide services and add value to park residents	Yes	High	The practicality and the compliance level are high	
The park management entity uses local suppliers whenever possible, and provides local business with opportunities to grow	No	Low	The practical level is high, and the compliance level is low	The percentage of firms with the localization rate of at least 50% is 50%.
The industrial park renders its services at realistic costs to cover operational expenditures	Yes	High	The practicality and the compliance level are high	

5.3 Assessment of the relevance of the EIP Index to the “local sustainable development indexes for the period 2013-2020”, issued in Decision 2157/Qđ-TTg dated 11 November 2013;

a. For Environment and park management indicators

There are only two indicators related to the environmental aspect stipulated in Decision 2157/2013/QĐ-TTg, including:

- » Percentage of IPs that comply with regulations for treating solid waste and wastewater.

- » Percentage of collected solid waste that is treated in accordance with established standards.

The survey's findings show that these two criteria are basic for the IPs. The IPs must comply with requirements stipulated in Decree 3535353535 or Decree 35/2022/ND-CP (Article 37, 1(a)) & Circular 35/2015/TT-BTNMT (Article 6 Provision 2; Article 11 Provision 1)). Specifically, it's covered in the recommended indicators e.g., D35.ENV.R2 and IF. ENV. P2

There is no indicator related to the park management stipulated in Decision 2157/2013/QĐ-TTg,

b. For Social indicators

The indicators are built on international frameworks, and state decrees, which include Decision 2157/QĐ-TTg dated 11 November 2013. Specifically, in accordance with the criteria on costs for cultural and sports activities

c. For Economic indicators

Indicators “Support companies in value chain linkages” (D35.ECO.R.12), “SME development” (IF.ECO.R.6), Local value added (UNIDO.ECO. P.11) and “Service delivery pricing” (IF. ECO.R.7) is related to indicators “ICOR ratio” and “The ratio of budget revenue to budget expenditure in the local area” in Decision 2157/Qđ-Ttg 2013. When an industrial park or tenant company can meet the requirement of the proposed indicators, it will operate more effectively, therefore increasing the ICOR ratio. Additionally, it will help the local SMEs/business development, thus increasing the total amount of tax that the companies pay.

The indicator “Market demand for EIP services and infrastructure” is related to the indicator “The ratio of development investment capital in the area to the total product in the area” in Decision 2157/Qđ-Ttg 2013. When the marketing plan is successful, it can attract investment from many local and international investors, thereby increasing the development investment capital in the area.

The indicator “Employment plan” (IF.ECO.R.2) is related to the indicator “Unemployment rate” in Decision 2157/Qđ-Ttg 2013. When an industrial park or a tenant company has a good employment plan, it may recruit more people, thus reducing the unemployment rate.

5.4 Measurement of indicators applicable at IP and company level

Status w.r.t measurement of the recommended indicators at three surveyed IPs is described below.

Table 8. Measurement of suggested indicators applicable at IP and company level

I. ENVIRONMENTAL INDICATORS					
Indicator	It is measured? Yes/No	How/Why	Actions for performance improvement	Mechanism for data collection	Mechanism for data sharing/ how it can be improved
Resources efficiency (RECP), Industrial symbiosis (IS)					
Number of IS* realized in the IPs	Yes, only in an IP	IS is recently introduced	Enhance identification of IS opportunities to have more IS being realized	IP developer should establish a database for IS related activities within IP	To start, UNIDO tool on IS identification opportunities should be introduced. The database should be assessable by tenant firms, and they should be encouraged to update the database with relevant information
Percentage of firms within IPs having RECP** implemented	Yes	It's based on RECP measures that have been implemented in companies	More RECP training is needed for tenant firms For SME they can use a RECP Guideline issued by MoIT ⁸	IP developer should have a RECP monitoring system in place. It can develop an online tool to monitor RECP activities from tenant firms	IP developer may deploy UNIDO RECP monitoring tool
Water supply and waste water					
Percentage of industrial wastewater from firms that is reused within or outside the industrial park, in accordance with legal requirements	No	W.w is being reused/ recycled in a number of firms, but its quantity is not measured because it's	First conduct Material Flow Analysis (MFA) at firms to find out how wastewater can be reused/ recycled within process, inside	Company should have a system in place to monitor quantity of w.w being reused/ recycled i.e: <ul style="list-style-type: none"> For firm having its own WWTP they have to 	The IP should have a list of major water consuming companies. Water meters should be installed for monitoring

⁸ RECP Guideline for SME –Issued by MoIT: https://scp.gov.vn/App_File/supports/15df2ad9-16a3-48d3-b49c-1768cbcaa8d6.pdf

		not legally binding and so far, there is no incentive to promote this. Additionally w,w generated by firms is being sent to central WWTP and the firms have no further information how it will be used	the company. Second, study how w.w can be reused outside the factory/IP limits	<p>monitor its water consumption and drainage water</p> <ul style="list-style-type: none"> For firm having its w.w being sent to central WWTP: monitor water consumption and w.w being sent to central WWTP 	water consumption and drainage. Firms and also IP developer have an access to meters' readings
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Natural environment and resilience

A programme is established with clear evidence of steps taken to monitor and reduce emissions of (CO2), methane (CH4) and nitrogen oxides (NOx)	No	CO ₂ concentration is measured periodically, not emission load because only CO ₂ concentration is regulated	IP should require major energy-consuming companies to monitor its CO ₂ emission and have measures to mitigate it	IP developer should have a data of GHGs inventory from major energy-consuming companies. GHGs emitted by other firms can be calculated using an IPCC guideline. Alternatively, GHGs inventory might be carried-out in the IP and be updated if there would be a change	IP developer should be granted an access to GHGs inventory reports. Companies should be required to send calculated GHG emission to IP developer
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Management and risks monitoring

Park management entity has a mechanism for monitoring inputs and outputs of materials to and from the industrial park, including energy, water, chemicals, and raw materials. They summarize results achieved in RECP and emission control	No	It's recently introduced in the Decree 35	This will facilitate IS and RECP activities and improve company's performance w.r.t environment and economic gains	IP developer should develop online tool that allows company to enter its input/output data; online reporting system for RECP, waste reduction and emission mitigation	Use online tools for input/output data collection and reporting
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in annual reports to the IP management authority					
Annually, the park management entity (and resident firms) publish reports on environmental protection and social responsibility towards employees and surrounding communities, to be then published on their websites	Yes	Yes w.r.t submitting environmental protection report. CSR is submitting in various forms e.g. Labor report, OHS and Accident/incident report. For publishing into website it's only recently introduced in Decree 35/ Decree 35	At present IP developer should receive these reports from firms to facilitate them in providing better/relevant services to tenant firms and in turn firm can be beneficial from it	The PM authority should share an access of those reports to IP developers	A mechanism should be developed that tenant firms are required to send those reports to IP developer as to PM Authority

II. PARK MANAGEMENT

Park management services

Park management entity maintains an EIP framework monitoring system in place, tracking and reporting: <ul style="list-style-type: none"> • Critical risk factors and related responses, at least for: <ul style="list-style-type: none"> ○ Risk points for the accidental release of hazardous solid, liquid and gaseous effluents, including during transportation and disposal when fire hazards are possible; ○ Applicable natural disaster risks (for example, earthquakes); 	No	Because its new requirement stipulated in Decree 3535353535	This new requirement that must be included in PM Authority mandate. Staff of this non-public business should be trained accordingly	Get information from tenant firms having RECP and IS opportunities realized	Tenant firms should be informed about these services provided by this non-public business under PMA
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<ul style="list-style-type: none"> o Critical risk management at the level of the park. • Acts as monitoring and pre-clearing institution for environmental issues on behalf of the regulatory bodies, as delegated. • Operates a central environment control unit with an emergency alert system for environmental and other hazards. 					
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<p>Park management has a plan in place, to be updated every seven years, to react to possible negative impacts due to climate change (e.g. heat waves and droughts, storms and floodwater events).</p>	No	As above and it's applicable for new EIP which does not exist yet	To become an EIP, the IP may revise its master plan based on this requirement and consequently work out a plan to improve its performance, can be by phases	Get information from newly approved EIP master development plan or a revised master plan for EIP transition	NA
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Management and risks monitoring

<p>The management entity of the industrial park shall assign a public non-business unit directly under the management board or an appropriate unit to perform the function of i) building and providing information in a</p>	No	EIP is new particularly IF for EIP	IP may revise its available services/ activities based on this requirement and work out a plan to accommodate it, can be by phases	Check annual reports on park performance, EIA, Strategic environmental assessment report; Plan for respond to environmental accident/ incidents	IP should document its services/ activities w.r.t EIP framework monitoring system and share with PMA and tenant firms
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<p>database on resource efficient and cleaner production (RECP); ii) proposing solutions and connect enterprises to implement industrial symbiosis; iii) providing supporting services for transition or new construction of eco-industrial parks</p>					
<p>IP developer are required to: register for investment attraction industries and trades; estimate emission loads for each industry; propose a plan for realization of industrial symbiosis, the plan for setting-up and implementation of a mechanism to monitor the inputs and outputs of the industrial park on the use of raw materials, materials, energy, water, chemicals and the implementation plan of social responsibility towards employees and the surrounding community in the dossier of investment project on the infrastructure construction and business of the industrial park</p>	<p>Partly Yes</p>	<p>02 IPs with No and an IP with Yes. For firm, almost half of the surveyed firms with Yes. It depends on the IP and firms. Because it's included in the EIA and SEIA</p>	<p>With extreme weather happened more frequent, it's important for the IP and tenant firms to have this plan exists to keep a continuity of IP operation. It's important that the plan should be updated at least every 7 years</p>	<p>Get information from EIA, SEIA report, construction records, bills or contracts regarding adaptaion measures (e.g. upgrading the energy or electricity systems, meters and grids, facilities, pipelines)</p>	<p>This plan should made public for trust building between IP, tenant firms a nearby community. Also, because some time public/ community knowledge about local climate characteristics would be a good source of information</p>

III. SOCIAL INDICATORS

Proportion of firms with more than 100 employees that have a code of conduct system in place to deal with grievances	No data	There are no regulations and guidelines on statistics and reporting	There should be regulations, and guidelines on statistics and reporting	Firms statistics and reports to IP authority	Periodic reporting is required, can be 6 months or 12 months. Online report be applied
Proportion of firms that have a Disclosure and Accountability System fully operational	No data	There are no regulations and guidelines on statistics and reporting	There should be regulations, and guidelines on statistics and reporting	IP authority collects statistics and makes annual reports	Reports can be posted online
Essential primary social infrastructure is adequately provided in the site master plan and is fully operational in the park	No data	There are no regulations and guidelines on statistics and reporting	There should be regulations, and guidelines on statistics and reporting	IP authority collects statistics and makes annual reports	Reports can be posted online
Percentage of firms in the industrial park with more than 100 employees that incorporated gender perspectives in the formulation, management and monitoring of plans and programs, and provide social insurance, health insurance, medical check-ups, occupational safety training	No data	There are no regulations and guidelines on statistics and reporting	There should be regulations, and guidelines on statistics and reporting	Firms statistics and reports to IP authority	Periodic reporting is required, can be 6 months or 12 months. Online report be applied
Dedicated personnel exist as part of the park management entity to plan, manage and enforce social quality standards	No dedicated staff	Currently in the sections of the IP authority there are experts related to social aspects	There should be regulations including assignment, and coordination between sections in the IP authority on aspects related to social indicators	There needs to be an officer to act as the focal point to collect information related to social indicators	Periodic reporting is required, can be 6 months or 12 months. Online report be applied

Proportion of firms with more than 100 employees that have a harassment prevention and response system in place	No data	There are no regulations and guidelines on statistics and reporting	There should be regulations, and guidelines on statistics and reporting	Firms statistics and reports to IP authority	Periodic reporting is required, can be 6 months or 12 months. Online report be applied
The IP management entity maintains or increases annual spending towards local community engagement and dialogue	No data	There are no regulations and guidelines on statistics and reporting	There should be regulations, and guidelines on statistics and reporting	IP authority collects statistics and makes annual reports	Reports can be posted online
IV. ECONOMIC INDICATORS					
The park management entity has a plan with clear evidence to develop economic synergies across their tenant companies and thereby realize economies of scale and greater bargaining power in business transactions	Yes	When park management can consolidate business action across the tenant companies, it can realize economies of scale and help tenant companies have greater bargaining power in business transaction. This can reduce the costs of tenant companies	IP authority should have an information system to collect the information of the tenant companies' demand for the input materials	IP authority should explain to the tenant companies that they have benefits from providing the information of their demand for the input materials to the IP authority	The report showing the plan of the IP authority should be digitalized and stored by both IP authority and IP developers
The park management entity is responsible for marketing the park and the EIP concept to potential national and international investors	Yes	The marketing plan will have to attract new investors to invest in the IP	The marketing plan should state very clearly the benefits of EIP	The tenant companies do not have to report the information to calculate this indicator	IP developer should keep the report and digitalize the report and then send it to the IP authority

<p>The park management entity has a strategy in place to create job opportunities for people living within 100 km radius from the industrial park</p>	<p>Yes</p>	<p>The employment plan helps to reduce the shortage of employees of the tenant companies. This may help the tenant companies to meet the demand during high demand seasons</p>	<p>IP authority should have an information system to collect the information about the labor of the local area. The information should include the labors' age, gender and other information if necessary (i.e., education level, skills)</p>	<p>The tenant companies do not have to report the information to calculate this indicator</p>	<p>The report showing the plan of the IP authority should be digitalized and stored by both IP authority and IP developers</p>
<p>The park management entity allows and promotes the establishment of SMEs that provide services and add value to park residents</p>	<p>Yes</p>	<p>An EIP should provide benefits to local and national SMEs</p>	<p>The fee paid by tenant companies can be reduced for the tenant companies which have business transaction with local or national SMEs. The reduction will be depended on the value of the transaction</p>	<p>The tenant companies should provide the information of the transaction between them and the local and national SMEs. The tenant companies should do this because they have the benefits from the fee reduction</p>	<p>IP developer should keep the report about the opportunity for SMEs and digitalize the report and then send it to the IP authority</p>
<p>The park management entity uses local suppliers whenever possible, and provides local business with opportunities to grow</p>	<p>Yes</p>	<p>When the revenue of the IP is higher than the costs, the IP can operate sustainably without the subsidy of the government</p>	<p>The fee paid by tenant companies can be reduced for the tenant companies which have business transaction with local suppliers. The reduction will be depended on the value of the transaction</p>	<p>The tenant companies should provide the information of the transaction between them and the local suppliers. The tenant companies should do this because they have the benefits from the fee reduction</p>	<p>IP developer should digitalize the reported sent by the tenant companies and then send it to the IP authority</p>
<p>The park management entity is responsible for marketing the</p>	<p>Yes</p>	<p>This indicator takes the value of 0 or 1 and is based on the</p>	<p>The marketing plan should state very clearly the benefits of EIP</p>	<p>The tenant companies do not have to report the information to</p>	<p>IP developer should keep the report and digitalize the report</p>

park and the EIP concept to potential national and international investors		answer of the respondent. The respondent needs to provide the report to prove the answer		calculate this indicator.	and then send it to the IP authority
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6. Recommendations on how the assessed EIP indicators and index can be used to improve the performance of companies:

In this part, a set of recommendations on how the selected national EIP indicators (described in *Part III*) can be used for the improvement of the company's performance is given. It's done by linking those indicators with related regulations and existing and possible incentives. Details are described in Table 10 below.

Table 9. EIP indicators utilized for the improvement of the company's performance

Indicator	Related regulations/ incentives	How it will be used for performance improvement	Recommendations
Resources efficiency (RECP), Industrial symbiosis (IS)			
Number of IS* realized in the IPs	There are incentives for environmental protection in general, not specifically for IS activities e.g., get a soft loan from EPF (Environmental Protection Fund) IS can be considered as an environmental protection work that may enjoy preferential treatment (Decree 19/2015/NĐ-CP) regulating in details of some Articles in EP Law Article 140. Provision 3 (c) – Decree 08/2022/NĐ-CP regulating in details of some Articles in EP Law (Circular Economy - CE): promote IS activities.	IS project can get a soft loan from EPF, or preferential treatment as stipulated in Decree 19/2015/NĐ-CP for IS realization	Incentives have to be specific for IS related project/ activities i.e., IS activities have to be specifically included in the List of activities/work that may enjoy preferential treatment and support Policy: Policy on simplification of the declassification of waste to by-product ⁹ can be developed to facilitate IS and CE activities

⁹ Policies and Strategic Incentives for CE and IS, Juan Henriques p.15

	Incentives stipulated in Decree 21/2011/NĐ-CP (Article 27 & 28) – stipulates details for implementing the law on rational use and saving of energy	Company can use this incentive for investment, renovate and changing technology, facilities, equipment, parts etc. for energy saving related activities	IP may develop a share database of wastes in which companies can publish what waste they can make available and in some cases, what waste they could take in ¹⁰ . Similar incentives for water savings related activities should be developed
Percentage of firms within IPs having RECP** implemented	As above. Specifically, incentives for purchasing clean technology (exemption from customs duties or value added tax. Additionally, as stipulated in Decision 889/2020/TTg on Sustainable Consumption and Production (SCP), city/ provinces are required have an annual plan on SCP that promotes RECP activities.	As above. Fund from SCP program may be allocated for RECP activities	The incentives must be specific for RECP related project/activities RECP activities have to be specifically included in the List of activities/work enjoyed preferential treatment and support. Introduce Performance-based fiscal incentives (PBIs) including feed-in tariff system. Tax deductions and depreciation allowances also provide incentives to change inefficient equipment faster ¹¹
Percentage of industrial wastewater from firms that is reused within or outside the industrial park, in accordance with legal requirements	No specific incentives	NA	At present treated w.w. is being reused for irrigation and firefighting purpose at some facilities. It can be reused for industrial and environmental purposes . Hence clear policy and guidelines for these purposes should be developed. At this stage most likely that there are no incentives would be needed

Natural environment and resilience

A programme is established with clear evidence of steps taken to monitor and reduce emissions of (CO ₂), methane (CH ₄)	GHGs mitigation is considered as an environmental protection work and is entitled to have incentives specified in Environmental protection law and related sub-law	GHGs mitigation is an instrument for companies to reduce negative impacts caused by its operation to environment, increase energy	Set an effective carbon price mechanism. It includes carbon tax/fees, emission trading system. Set emission tax and abatement subsidies. Create permit system and quota for GHGs
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¹⁰ How to create Incentives for IS, SCALERProject, 2019, p27

¹¹ Stimulating the market: Incentives for CP and EE in Latin America, Ashtor, W.S, p3

¹² Incentive system for w.w treatment and reuse in irrigated agriculture in the MENA region, Maher OmarRushdi Abu-Madi, p40

and nitrogen oxides (NOx)	documents (<i>Decree 06/2022/NĐ-CP, Article 33, Provision 3</i>) Development of carbon market to allow companies for trading carbon credit	efficiency and create carbon credit etc. It also facilitates exports products to EU as in accordance with CBAM (Carbon Border Adjustment Mechanism ¹³)	
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Management and risks monitoring

Park management entity has a mechanism for monitoring inputs and outputs of materials to and from the industrial park, including energy, water, chemicals, and raw materials. They summarize results achieved in RECP and emission control in annual reports to the IP management authority	It's only included in Decree 35, no incentive available	NA	Decree 35 implementation w.r.t this requirement must be enforced. Build up a champion/good example and scaling up to other IPs
Annually, the park management entity (and resident firms) publish reports on environmental protection and social responsibility towards employees and surrounding communities, to be then published on their websites	Ibid.	NA	Content of the environmental protection report and CRS in relation with neighboring community should be developed. It may include relevant content based on indicators from VCCI CSI 2022 and GRI (Global Reporting Initiative) version 4

¹³ <https://congthuong.vn/giam-phat-thai-khi-nha-kinh-yeu-cau-bat-buoc-voi-doanh-nghiep-xuat-khau-181517.html>

Park management services

<p>Park management entity maintains an EIP framework monitoring system in place, tracking and reporting:</p> <ul style="list-style-type: none"> • Critical risk factors and related responses, at least for: <ul style="list-style-type: none"> ○ Risk points for the accidental release of hazardous solid, liquid and gaseous effluents, including during transportation and disposal when fire hazards are possible; ○ Applicable natural disaster risks (for example, earthquakes); ○ Critical risk management at the level of the park. • Acts as monitoring and pre-clearing institution for environmental issues on behalf of the regulatory bodies, as delegated. • Operates a central environment control unit with an emergency alert system for environmental and other hazards. 	<p>Ibid.</p>	<p>NA</p>	<p>The non-public business unit has to be assigned with specific tasks related to these requirements. A shared database w.r.t RECP, IS, services to support in EIP transition and new EIP should be developed between this unit and IP developer</p>
<p>Park management has a plan in place, to be updated every seven years, to react to possible negative impacts due to</p>	<p>Ibid.</p>	<p>NA</p>	<p>Government may issue an industrial development bond for new EIP</p>

<p>climate change (e.g. heat waves and droughts, storms and floodwater events)</p>			<p>In the process of developing new EIP, new investments in the IP/region should be given incentives so that they are made in sectors which will support the industrial symbiosis¹⁴. Provide incentive programs that will encourage companies to participate in EIPs: provide incentive and assistance needed to implement PP (Pollution Prevention), energy efficiency, and other environmental programs. Financial packages: tax abatements, funding for employee training and infrastructure improvements EIP developers might consider offering a useful incentive like technical support in design and budgeting, especially for smaller tenants¹⁵</p>
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Management and risks monitoring

<p>The management entity of the industrial park shall assign a public non-business unit directly under the management board or an appropriate unit to perform the function of i) building and providing information in a database on resource efficient and cleaner production (RECP); ii) proposing solutions and connect enterprises to implement industrial symbiosis; iii) providing supporting services for transition or new construction of eco-industrial parks</p>	<p>No incentive available</p>	<p>NA</p>	<p>This EIP international framework monitoring system might be streamlined into current monitoring system e.g. for EIA, SEIA, environment, social, economic performance, plan for climate change, response plan to environmental incident/accidents</p>
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¹⁴ Opportunities for sustainable development in Turkey: EIP, Gazi University Journal of Science, 24(93):637-646(2011), p8

¹⁵ Field book for development of EIP – p140

<p>IP developer are required to: register for investment attraction industries and trades; estimate emission loads for each industry; propose a plan for realization of industrial symbiosis, the plan for setting-up and implementation of a mechanism to monitor the inputs and outputs of the industrial park on the use of raw materials, materials, energy, water, chemicals and the implementation plan of social responsibility towards employees and the surrounding community in the dossier of investment project on the infrastructure construction and business of the industrial park</p>	<p>Required by Decree 35/2022/NĐ-CP. No incentive available</p>	<p>NA</p>	<p>This plan might be streamlined into existing reports e.g., EIA, SEIA, Environmental protection plan etc</p>
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III. SOCIAL INDICATORS

<p>Proportion of firms with more than 100 employees that have a code of conduct system in place to deal with grievances</p>	<p>Required by Decree 35, Article 45 &63 Decree 35, article 51</p>	<p>In Decree 35 and Decree 35, the procedures for receiving and settling complaints are clearly specified. There should be specific rules for the collection, statistics, and reporting</p>	<p>Specific rules for collection, statistics, and reporting should be in place</p>
<p>Proportion of firms that have a Disclosure and Accountability System fully operational</p>	<p>Decree 35, Article 43, 47. Environmental Law 2020, Articles 4, 59</p>	<p>Decree 35 and Decree 35, provide a clear disclosure of the information about the activities of enterprises and industrial zones such as infrastructure, cleaner production. There should be specific regulations on the collection, statistics, and reports</p>	<p>Specific rules for collection, statistics, and reporting should be in place</p>

Essential primary social infrastructure is adequately provided in the site master plan and is fully operational in the park	Decree 35, Article 36, 37	Decree 35 and Decree 35 have provided incentives for essential infrastructure, and social infrastructure. More detailed regulations on social infrastructure are needed	More detailed regulations on social infrastructure are needed. Specific rules for collection, statistics, and reporting should be in place
Percentage of firms in the industrial park with more than 100 employees that incorporated gender perspectives in the formulation, management and monitoring of plans and programs, and provide social insurance, health insurance, medical check-ups, occupational safety training	No	Decree 35 has regulations on social security, and training on occupational and safety, however, there are no regulations on gender equality in these contents. Despite the fact that firms pay attention to the gender aspect	There should be regulations on gender equality in topics related to social security, in training on occupational and occupational safety, and cleaner production etc. Specific rules for collection, statistics, and reporting should be in place
Dedicated personnel exist as part of the park management entity to plan, manage and enforce social quality standards	No	Although there is no regulation on one person in charge of social indicators, in fact, many departments in the IP Authority have staffs to monitor, collect data, and engage on social indicators	There should be a provision on the focal point for social indicators at the IP authority. Specific rules for collection, statistics, and reporting should be in place
Proportion of firms with more than 100 employees that have a harassment prevention and response system in place	Article 5 Labor Law 2019	Although the labor law has provisions on the prevention of harassment in the workplace, however, there are no specific regulations on the collection, statistics, and reporting of	Specific rules for collection, statistics, and reporting should be in place
The IP management entity maintains or increases annual spending towards local community engagement and dialogue	Decree 35, article 37	In fact, many firms and industrial zones have expenses for activities with the local community. However, there are no specific regulations on the collection, statistics, and reporting	Specific rules for collection, statistics, and reporting should be in place

IV. ECONOMIC INDICATORS

<p>The park management entity has a plan with clear evidence to develop economic synergies across their tenant companies and thereby realize economies of scale and greater bargaining power in business transactions</p>	<p>No</p>	<p>Eco-industrial parks need to be organized to attract companies that can have circular economic transactions with each other. To do this, the industrial park need a modern information management system to speed up the exchange of information between companies operating in the industrial park. The incentives will help tenant firms to obtain detailed information on demand for input and output. This business can reduce costs and increase revenue. This will help improve the performance and competitiveness of enterprises in the eco-industrial park. This will also help improve the management efficiency of companies in the value chain. In addition, these incentives also help companies to support each other in production, service, and the transfer of eco-industrial initiatives</p>	<p>Should apply in Decree 35: tenant firms should report inputs, outputs and waste information to authorities in order to create information network about it in eco-industrial park. The IZ management board needs to rely on this information to build an information system that all companies operating in the IZ can access in a timely manner</p>
<p>The park management entity is responsible for marketing the park and the EIP concept to potential national and international investors</p>	<p>Decree 35/2022/ND-CP, Decision 1658/QD-TTg 2021</p>	<p>State agencies will organize seminars to connect the industrial parks with international investors, and this can help to raise awareness about eco-industrial parks for investors and companies in the industrial park. These incentives will help investors know more detail about EIP and thus that are willing to invest in EIP.</p>	<p>The park management needs to organize seminars to promote eco-industrial parks and eco-industrial concepts at least once a year</p>

		<p>With the participation of professional investors, the EIP may have many eco-industrial initiatives, helping to ensure the sustainable operation of the eco-industrial park. In addition, these incentives also help many companies to have information about EIP and thereby make decision in choosing EIP to operate</p>	
<p>The park management entity has a strategy in place to create job opportunities for people living within 100 km radius from the industrial park</p>	No	<p>Establishing job counseling centers in industrial zones. These centers are responsible for researching the local workforce and are responsible for providing information on the needs of the IP to the local workforce. These incentives will capture information about the local workforce, thereby helping companies operating in the EIP to be proactive about human resource</p>	<p>The decree 35 should mention the establishment of a career counseling and development center in industrial zones. This center is responsible for collecting the information of the local workforce. This center also needs to be responsible for providing quickly and promptly information on the labor demand of the EIP to the locality</p>
<p>The park management entity allows and promotes the establishment of SMEs that provide services and add value to park residents</p>	<p>Decree 35/2022/ND-CP. Decision 1658/QD-TTg 2021</p>	<p>When an industrial park buys a large amount of goods from small and medium-sized companies, these goods are only subject to a lower tax rate for related taxes, such as value added tax. This incentive will help tenant firms to reduce cost to buy input materials from small and medium enterprises, thereby helping these enterprises to be proactive in the production process. The local small and medium enterprises also have the opportunity to develop through the establishment of business relationships with each other, to support the buying and selling process</p>	<p>Decree 35/2022/ND-CP needs to refer to the supports: exemption and reduction of land rent, land use levy, and non-agricultural land use tax; exemption or reduction of corporate income tax for a given point in time</p>

<p>The park management entity uses local suppliers whenever possible, and provides local business with opportunities to grow</p>	<p>Decree 35/2022/ND-CP</p>	<p>When an industrial park buys a large amount of goods from local suppliers, these goods are only subject to a lower tax rate for related taxes, such as value added tax. This incentive will help tenant firms to reduce cost to buy input materials from small and medium enterprises, thereby helping these enterprises to be proactive in the production process. The local small and medium enterprises also have the opportunity to develop through the establishment of business relationships with each other, to support the buying and selling process</p>	<p>Decree 35/2022/ND-CP needs to refer to the supports: exemption and reduction of land rent, land use levy, and non-agricultural land use tax; exemption or reduction of corporate income tax for a given point in time</p>
<p>The industrial park renders its services at realistic costs to cover operational expenditures</p>	<p>No</p>	<p>Investors investing in eco-industrial parks can get priority loans from the Vietnam Environmental Protection Fund, the Vietnam Development Bank, the Small and Medium Enterprise Development Fund and other domestic and international fund. In addition, investors can also be granted green credit at credit institutions, foreign bank branches in Vietnam, and they can issue green bonds. Investors investing in eco-industrial park and companies operating in the industrial park can enjoy reduced tax and related fees when operating in the industrial parks. When an industrial park buys a large amount of goods from small and medium-sized companies or from local suppliers, these goods are only subject to</p>	<p>The financial institution need to have guidelines/ handbook on the development of green debt, sustainable debt instruments according to international standards for firms in eco-industrial parks. The government should also consider reducing land rental fees for eco-industrial parks</p>

a lower tax rate for related taxes, such as value added tax. These incentives will help investors in EIP raise capital at a low cost and they can provide services at a reasonable cost to attract companies. This will reduce the cost and increase the revenue of the EIP

7. Conclusions

In Vietnam, EIP development has gained strong support from relevant key stakeholders i.e., the government, park management authority, industrial park developer and tenant firms. However, the transition process of existing IPs to EIPs takes time and requires not only strong commitment from stakeholders but also adequate capacity building and financial resources.

Based on Decree 35/2018/ND-CP, the new Decree 35/2022/ND-CP, UNIDO's work and the International Framework for EIP developed by UNIDO, World Bank and GIZ, a set of 23 indicators for the environment, park management, social and economic were suggested and pilot tests were conducted in four IPs (Amata, Deep C, Hiep Phuoc and Hoa Khanh IPs) in the North, Center and South of Vietnam.

The results show that several indicators are still not met by the surveyed IPs (*see Table 8*) and are not measured because not mandatory (*see Table 9*), though the ability of these IPs to apply those indicators is pretty high (*see Table 9*). To measure the EIP indicators scientifically and objectively, the development of methodology sheets for each indicator is needed.

Furthermore, there is still a limited number of incentives available to promote EIP-related activities (*see Table 11*) and, based on what is available, a recommendation was provided to address the existing gaps.

Vietnam has started the EIP development a few years ago and the government is committed to supporting it. In 2019, UNIDO, in consultation with MPI, prepared a roadmap for transforming IPs in Vietnam through three stages: Preparation, Piloting and Expansion¹⁶. Vietnam is currently in the piloting stage. It is expected that this stage will run smoothly and sufficient consideration is given to the findings from field studies and assessments on the ground, including those presented in this report.

¹⁶ UNIDO, 2019. ECO-INDUSTRIAL PARKS VIET NAM STAKEHOLDER ANALYSIS AND DEVELOPMENT ROADMAP. Available at <https://open.unido.org/api/documents/14530717/download/EIP-Vietnam-Stakeholder-analysis-and-development-roadmap.pdf>

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