GEIPP

GLOBAL ECO-INDUSTRIAL PARKS PROGRAMME

THE ECO-INDUSTRIAL PARK – POLICY NEXUS

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GEIPP
GLOBAL ECO-INDUSTRIAL PARKS PROGRAMME

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THE ECO-INDUSTRIAL PARK – POLICY NEXUS

How policies can act as barriers or enablers in the fulfilment of eco-industrial park requirements

GEIPP

2022

ABBREVIATIONS

CE	Circular Economy
DGNB	Deutsche Gesellschaft für Nachhaltiges Bauen (German Sustainable Building Council)
EIA	Environmental Impact Assessment
EIP	Eco-Industrial Park
EMS	Environmental Management System
EnMS	Energy Management System
FTZ	Free Trade Zone
GEIPP	Global Eco-Industrial Parks Programme (UNIDO)
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Development Cooperation)
IP	Industrial Park
LEED	Leadership in Energy and Environmental Design
NCPC	National Cleaner Production Centre
OEM	Original Equipment Manufacturer
OHSMS	Occupational Health and Safety Management System
R&D	Research and Development
RE	Renewable Energy
RECP	Resource Efficiency and Cleaner Production
SECO	State Secretariat for Economic Affairs of Switzerland
SME	Small and Medium-sized Enterprises
SOP	Standard Operating Procedure
UNIDO	United Nations Industrial Development Organization
WBG	World Bank Group
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

This report is the third publication of the GEIPP's "Lessons Learnt" series aimed at compiling and disseminating results from the Global Eco-Industrial Parks Programme (GEIPP). It studies in detail what could be the areas where policies, or lack of them, could be blocking the implementation by industrial parks of the International Framework for Eco-Industrial Parks, and where instead the implementation of the Framework could be supported by policies. The analysis is based on an in-depth review of the requirements making up the Framework, as well as on a review of various country-level reports prepared in the GEIPP and interviews with Field staff of the GEIPP.

CATEGORISING THE REQUIREMENTS MAKING UP THE INTERNATIONAL EIP FRAMEWORK

The International Framework for Eco-industrial Parks contains 64 separate requirements which have to be met by tenant firms and park management entities. They are clustered into four topics: park management; environmental performance; social performance; economic performance. Nearly half of the requirements relate to the environmental performance of a park, with the remaining requirements being distributed about evenly among the other three topics. These 64 requirements were subjected to a categorisation exercise, where they were assigned one or more of five categories: (1) where there was no evidence that policies could either be a barrier to, or be supportive of, the implementation of requirements; (2) where policies could be supportive of the implementation of the requirements; (3) in countries with laws governing the establishment of industrial parks, where these laws could be amended to insert requirements specifically aimed at park management entities, to better support them in their implementation of these requirements; (4) where existing policies could be a barrier, impeding the implementation of requirements; (5) where instead the absence of policies could be a barrier, impeding the implementation of requirements. The categorisation exercise gave rise to 96 categorisations –a good number of 64 EIP requirements were assigned more than one category.

What this categorisation exercise shows is that the role of government policies in the implementation of the EIP requirements can be characterised as quite important. Overall, for about one third of the EIP requirements government policies will not affect – either positively or negatively – their implementation. If one considers then that many EIP requirements can also be implemented even if supportive policies are not in place – it might be more difficult for them to be implemented, but not impossible – then the portion of EIP requirements that can be implemented without policy intervention grows considerably, to somewhere in the region of two-thirds to three-quarters of all EIP requirements. It is only a minority of EIP requirements – one quarter to one third – where existing policies, or a lack of them, could actually stymie their implementation, if not impede it completely. The picture changes considerably, though, when one focuses on the individual topics covered by the EIP requirements. The EIP requirements related to social and economic performance could all (social) or very nearly all (economic) be implemented even in the absence of supportive policies, although in a number of cases such policies would be helpful. On the other hand, implementation of a good number of the EIP requirements related to park management could be stymied by the lack of policies, while implementation of nearly half of the EIP requirements related to

environmental performance could be blocked either by existing policies or by the lack of policies.

BARRIERS TO EIP IMPLEMENTATION CREATED BY EXISTING POLICIES

A more detailed analysis of cases where existing policies could be creating barriers to the implementation of EIP requirements shows that by far the greatest number of such policy barriers affect the requirements related to environmental performance, while a not insubstantial number also affect requirements related to park management. National waste management laws and regulations could be the source of a considerable number of such barriers. The EIP requirements that would be particularly affected are those promoting industrial symbiosis (the reuse by one firm of another firm's waste as a raw material). The barriers come from the manner in which most waste management laws and regulations define "waste", coupled with the heavy authorisation regime for the management of anything deemed to be waste. Laws and regulations governing the management of wastewaters could add a further barrier to industrial symbiosis in cases where the reuse of wastewater would be the focus. Other existing policies which could be creating barriers are those governing the installation of RE systems, those governing the preparation of EIAs, and those regulating the fiscal exemption regime of FTZs or equivalent parks.

BARRIERS TO EIP IMPLEMENTATION CREATED BY THE ABSENCE OF POLICIES

The implementation of several groups of EIP requirements could be affected by the absence of policies. Perhaps the area where such absence could be most critical is in the initial establishment of parks. Potential policy gaps include: a lack of an investment programme by governments in the necessary external infrastructure (electricity lines, water lines, roads) to ensure that they are brought to the park fence ready for hook-up; a lack of an investment programme by governments in decent housing in the surrounding communities for the parks' workers; the allocation of too little land to the parks for them to be able to satisfy all the EIP's spatial requirements. Another area where the lack of policies could be problematic is the absence of technical regulations, meaning that the laws which these regulations should support cannot be properly implemented. Absence of such regulations could lead to barriers to the reuse of industrial wastewater; to parks extracting and consuming water at sustainable levels; to tenant firms being able to have the wastes they cannot reuse treated and disposed of. Other situations where the lack of policies could create a barrier are: in the implementation of certain types of circular economy practices; and in the ability of park management entities to provide their services in a financially sustainable manner.

POLICIES TO SUPPORT IMPLEMENTATION OF EIP REQUIREMENTS

The policies which could support the implementation of EIP requirements fall into several groups.

Governments could publish various types of official guidance documents to help parks implement certain of the EIP requirements in a harmonised way (these guidance documents would not just be useful to tenant firms; any enterprise in the country would benefit from them). The subjects of these guidance documents would be at least the following: the localisation of high-risk industries within parks; the good practices to adopt for the appropriate management of hazardous materials and wastes; the standard sampling and measurement methods to be used by laboratories in measuring pollutant levels; the native species of flora and fauna which parks should strive to maintain.

Governments could offer training and knowledge dissemination to help parks implement a series of EIP requirements – or they could ensure that this training and knowledge dissemination is offered by industry support institutions. This support could take the form of preparing information dissemination documents, delivering training, making the services of external experts available, or undertaking audits. The topics on which this training and knowledge dissemination could focus can be broken down into two broad categories: those having to do with management systems, strategies, or other procedures which park management entities and/or tenant firms need to put in place; those having to do with identifying technical solutions which park management entities and/or tenant firms can implement to reduce various environmental impacts.

One possible outcome of the training and knowledge dissemination efforts could be that park management entities or tenant firms (or even parks' investors) will need to invest in infrastructure, technologies, or equipment. Governments could support these investments through various programmes (low-interest loans, credit guarantees, grants, etc.) which reduce the cost of borrowing.

Another possible outcome of the training and knowledge dissemination efforts could be that park management entities or tenant firms identify options that are either not well known or not well characterised in the context of an industrial park. In these cases, governments could support R&D to help park management entities and tenant firms better understand and characterise their options.

There are a number of EIP requirements where to satisfy them tenant firms and park management entities would need to draw on the services of external specialised service providers. Governments can ensure that these service providers are duly accredited and available to parks by putting in place the necessary accreditation mechanisms and by working to ensure that a sufficient number of them are available for the parks to use (their services will also be useful to other enterprises not located in parks).

Finally, in the specific case of countries which have laws on the books governing the creation of industrial parks, governments wanting to see the transition of their parks to EIP status could support that process by amending the laws to insert into them many of the EIP requirements aimed at park management entities, thus raising these requirements to the status of a legal requirement. Doing so would help park management entities in implementing their EIP-related responsibilities.

MONITORING AND ENFORCING COMPLIANCE IN EIPS

Some EIP requirements expect park management entities to be given the responsibility of monitoring and enforcing compliance inside the park and outside it. This expectation does throw up a series of issues: the need for the competent authorities to formally delegate this responsibility to park management entities – assuming they are even legally allowed to give out such a delegation; the scope of this delegation – can it extend outside the park?; the gap in enforcement coverage if this delegation is given and if the park management entity does itself needs to comply with regulations (it cannot monitor and enforce its own compliance); problems in enforcement if the park management entity is a government body – can government take itself to court for non-compliance? These issues need to be worked out during an EIP's planning stage.

RECOMMENDATIONS

Specific recommendations are given for each of the barriers which have been identified and each of the areas where supportive policies could play a role. However, this mass of individual recommendations cannot be effectively implemented in an *ad hoc*, piecemeal

fashion. They need to be implemented within a broad process in which all of the stakeholders in EIPs are involved. Upgrading industrial parks to EIP status will only be successful if all of the major stakeholders in EIPs are actively involved in the process of transitioning IPs to EIPs, and governments are going to be one of the key stakeholders in this process. One of the stakeholders' tasks will be to analyse the existing policy landscape and decide if policies need to be amended, either to eliminate barriers to implementation of the EIP requirements or to be more supportive of that implementation. The specific recommendations made can be reviewed during this analysis.

One important aspect of this policy review will be to assess what support programmes might be necessary to support industrial parks in their implementation of the EIP requirements. In many cases, governments will already have created support programmes, so it would not be a case of governments having to create new support programmes de novo but rather of extending the eligibility criteria or the scope of existing support programmes to cover the issue of industrial parks attempting to transition to EIP status. For instance, governments will often have programmes which are supporting enterprises through training and other services offered by industry support institutions. In this case, it would be sensible to extend the scope of work of the more relevant industry support institutions to cover the topics which are of interest in the EIP transition. Governments will also often have schemes to support investments by enterprises. Here, it would be sensible to extend the eligibility criteria of the existing schemes so that tenant firms and park management entities (as well as investors in those parks) can access the schemes. Similarly, governments might already have programmes through which they support R&D undertaken by the private sector. Here, too, it would be sensible to extend the eligibility criteria of the existing programmes so that tenant firms and park management entities in parks going for EIP status can access the programmes.

In a good number of the EIP requirements, there is a clear expectation that the park management entities should be offering tenant firms the necessary support to implement the requirements. But the park management entities will not be able to offer these services if they do not have staff on board with the necessary skills and training. Therefore, during their analysis of what supportive programmes need to be created or extended, the stakeholders should also consider the issue of which of the support services it would be realistic to have the park management entity offer. This should then lead to decisions about the post(s) which should be created within the park management entity and about the necessary training programme(s) which the person(s) in those post(s) receive to then be able to offer the services to tenant firms.

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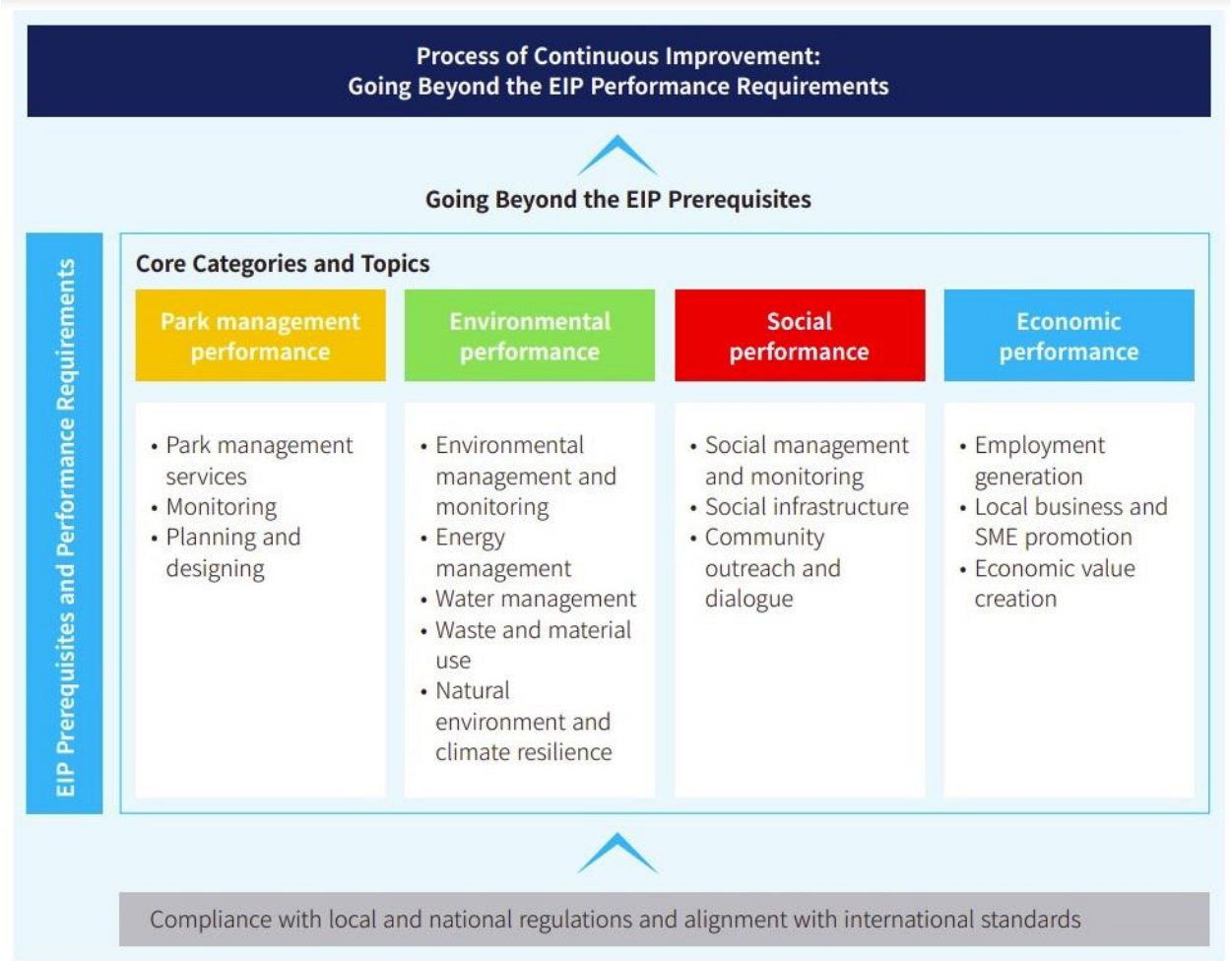
1 INTRODUCTION

1.1 INTERNATIONAL EIP FRAMEWORK AND ITS APPLICATION

UNIDO, the World Bank Group and GIZ (German Development Cooperation) have collaborated to develop an "International Framework for Eco-Industrial Parks", which provides guidance on what constitutes an eco-industrial park and how an industrial park can work towards becoming an eco-industrial park1.

Figure 1: Overall framework for describing Eco-Industrial Parks (UNIDO, WBG, GIZ, 2017)



The framework clusters the requirements into four groups:

- Those related to the performance of the park's management;
- Those related to the environmental performance of the park;
- Those related to the social performance of the park;

1 UNIDO, WBG, GIZ (2021). An International Framework for Eco-Industrial Parks. Version 2.0 https://openknowledge.worldbank.org/handle/10986/35110

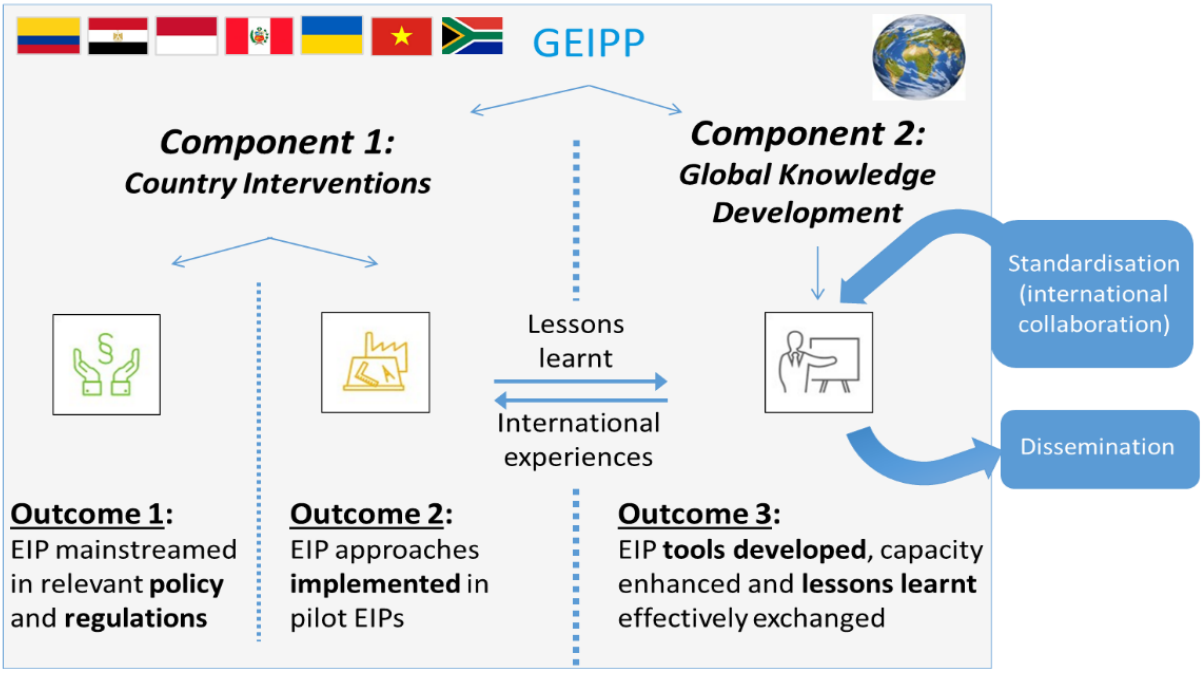
» Those related to the economic performance of the park.

The requirements within each group are divided into "prerequisites" and "performance indicators", which can be verified and measured in qualitative and/or quantitative terms. The prerequisites highlight the basic requirements for EIPs, while the performance indicators describe expected performance levels that an EIP must meet. As a baseline, industrial parks must comply with all applicable local and national regulations. Further details on the international framework can be downloaded from the publication weblink in the footnote.

1.2 GLOBAL ECO-INDUSTRIAL PARKS PROGRAMME (GEIPP)

The objective of the Global Eco-Industrial Parks Programme (2019-2023) 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. It takes as the basis for its work the "International Framework for Eco-Industrial Parks" described above.

Figure 2: 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 incentivizing EIPs through policies/regulations as well as 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 learnt from international experiences.

The GEIPP is made possible by funding provided by the Swiss Government through the State Secretariat for Economic Affairs of Switzerland (SECO).

1.3 THIS REPORT

To assist in the implementation of the GEIPP, but also to make available to any other interested parties the lessons which have been learned in implementing the Programme, the GEIPP has created a "Lessons Learnt" series of publications aimed at collecting and disseminating results from the Global Eco-Industrial Parks Programme (GEIPP) The first two reports in this series are:

- "Lessons Learnt from Assessing 50 Industrial Parks in Eight Countries against the International Framework for Eco-Industrial Parks", Lessons Learnt Series, Issue 1, December 2020.
- "Technical Assistance Needs for the Transformation into Eco-Industrial Parks", Lessons Learnt Series, Issue 2, May 2021.
- "Assessing the contribution of Eco-Industrial Parks to the Sustainable Development Goals, Lessons Learnt Series, Issue 3, December 2021

This report is the fourth publication in the series

In the second publication in the series, it was noted that there was a key role for government agencies to play to support the EIP transformation through policy support. The report pointed out key examples of challenges faced by park management entities and tenant firms where they would benefit from the strengthening of policy support: the planning and zoning of industrial parks, expanding the requirements and incentives to industrial parks/firms to address and adapt to climate change, streamlining regulations to facilitate the safe reuse and recycling of industrial by-products and effluent streams between tenant firms.

This report studies in greater detail what could be the areas where park management entities and tenant firms could most benefit from policy support. It is based on an in-depth review of the set of prerequisites and performance indicators which make up the international framework for what constitutes an eco-industrial park[2], as well as on a review of various country-level reports prepared in the Programme and interviews with Field staff of the GEIPP.

The report is structured as follows:

- It starts by laying out the research methodology which was used to prepare the report (Chapter 2).
- It then provides detailed insights into five different ways in which the existence of policies, or lack thereof, can affect the ability of park management entities and the tenant firms to meet the prerequisites and performance indicators (chapters 3-7).
- In a separate chapter, it discusses the specific issue of monitoring and enforcement of compliance in an Eco-Industrial Park (Chapter 8).
- In the final chapter, the conclusions from chapters 3 through 8 are summarised, along with a series of recommendations on how countries wishing to embark on a process of transforming their industrial parks to eco-industrial parks could develop the necessary conducive policy framework to support this transformation (Chapter 9).

[2] This international framework was developed jointly by UNIDO, the World Bank Group, and GIZ. See "An International Framework for Eco-Industrial Parks Version 2.0", January 2021. Available at https://openknowledge.worldbank.org/handle/10986/35110

2 METHODOLOGY

In order to identify the areas where industrial park management and tenant firms most need policy support in order to meet the prerequisites and performance indicators making up the EIP international framework, a four-step process was adopted.

2.1 INITIAL DOCUMENT REVIEW

For the six countries which were the focus of the analysis (**Colombia, Indonesia, Peru, South Africa, Ukraine, and Viet Nam**), various country-level documents prepared for the project were reviewed – a full list of these documents can be found in Annex A. The purpose of this review was to assess what policy framework was currently in place to support the transition of IPs to EIP status, and what might the gaps or barriers be in that framework.

2.2 INTERVIEWS WITH FIELD STAFF

On the basis of the results of this initial review, interviews were held with project staff or project consultants in four of the six countries: **Colombia, Indonesia, South Africa, and Ukraine**. The list of persons interviewed can be found in Annex A.

2.3 DETAILED REVIEW OF EIP PREREQUISITES AND PERFORMANCE INDICATORS

On the basis of the previous two steps, a detailed review was undertaken of the prerequisites and performance indicators making up the EIP international framework, to assess in more depth how policies (or lack of them) could affect the ability of industrial park management or tenant firms to meet these EIP requirements. A categorisation system was devised, where five categories could be assigned to each of the prerequisites and performance indicators:

- Prerequisites and performance indicators where there was no evidence that policies could either be a barrier to their implementation or could be supportive of their implementation;
- Prerequisites and performance indicators where there was evidence that policies could be (more[3]) supportive of their implementation;
- Specifically for prerequisites and performance indicators aimed at park management entities, where there was evidence that, in countries with laws governing the establishment of industrial parks, these laws could be amended to better support park management entities in their implementation of these prerequisites and performance indicators;
- Prerequisites and performance indicators where there was evidence that existing policies could be a barrier, impeding their implementation;

[33] It could be that countries do have supportive policies in place, but those policies could be strengthened.

- Prerequisites and performance indicators where there was evidence that the absence of policies could be a barrier, impeding their implementation.
- Although in general individual prerequisites and performance indicators were assigned only one category, an important number were assigned more than one category. The reason for this is that these prerequisites and performance indicators cover various dimensions, each of which has different policy implications.

2.4 REVIEW OF RESULTS BY FIELD STAFF

The results of the previous step were shared with the Field staff who had been interviewed, as well as with Field staff in Peru, to obtain feedback from them on the proposed categorisations. The categorisations were modified on the basis of the feedback received.

3 CATEGORISING THE INTERNATIONAL EIP REQUIREMENTS

This chapter describes the results of the categorisation of the full set of requirements which are given in the guidance document "International Framework for Eco-Industrial Parks".[4] The requirements are laid out in Annex B, following the layout in the guidance document. The only thing which has been added is a column numbering the requirements (this numbering system is used in the next four chapters).

The International Eco-industrial Parks Framework version 2 of 2021 contains 64 separate requirements. An industrial park needs to satisfy all 64 requirements if it wishes to be considered an eco-industrial park as defined in the International Framework. The 64 requirements are clustered into four groupings which cover the following topics: park management; environmental performance; social performance; economic performance. Their distribution is as follows:

- Park management: 9 requirements in total, of which 7 are prerequisites and 2 are performance indicators;
- Environmental performance: 30 requirements in total, divided equally between prerequisites and performance indicators;
- Social performance: 14 requirements in total, of which 2 are prerequisites and 12 are performance indicators;
- Economic performance: 11 requirements in total, of which 7 are prerequisites and 4 are performance indicators.

As can be seen, nearly half of the total number of requirements relate to the environmental performance of the park, with the remaining requirements distributed about evenly among the other three groups. The categorisation exercise described in Section 2.3 gave rise to **96 categorisations** – as explained in that section, a good number of prerequisites and performance indicators were assigned more than one category. Table 1 shows the distribution of categories among the EIP requirements.

Table 1: Distribution of categories among the EIP requirements

EIP requirements to which only one category has been assigned	44
EIP requirements to which two categories have been assigned	13
EIP requirements to which three categories have been assigned	4
EIP requirements to which four categories have been assigned	2

[4] UNIDO, WBG, GIZ (2021). An International Framework for Eco-Industrial Parks. Version 2.0 https://openknowledge.worldbank.org/handle/10986/35110

EIP requirements to which five categories have been assigned	1
TOTAL	64

The great majority (84%) of the EIP requirements which have more than one category assigned to them fall into the environmental performance group. A possible reason for this could be that the environmental requirements often cover a number of different environmental aspects in one and the same requirement. It is also true that in this grouping especially, the performance requirements mirror the prerequisites quite closely, so that the same environmental aspect will receive the same categorisation twice.

Annex C shows the categories which have been assigned to each prerequisite and each performance indicator.

Table 2 and Figure 4 show how the 96 categorisations are distributed, in total and within each of the four groupings making up the full list of EIP requirements.

Table 2: Distribution of 96 categorisations

	PARK MANAGEMENT	ENVIRONMENTAL PERFORMANCE	SOCIAL PERFORMANCE	ECONOMIC PERFORMANCE	TOTAL
EIP requirements where no policy barriers exist or policy support is needed to implement them	1	8	13	3	25
EIP requirements where policies could be supportive of their implementation	1	27	1	0	29
EIP requirements where including requirements in IP Laws could support park management entities specifically	6	1	0	8	15
EIP requirements where existing policies could be a barrier to their implementation	0	14	0	0	14
EIP requirements where the absence of policies could be a barrier to their implementation	5	7	0	1	13
TOTAL	13	57	14	12	96

Figure 3: Distribution of 96 categorisations

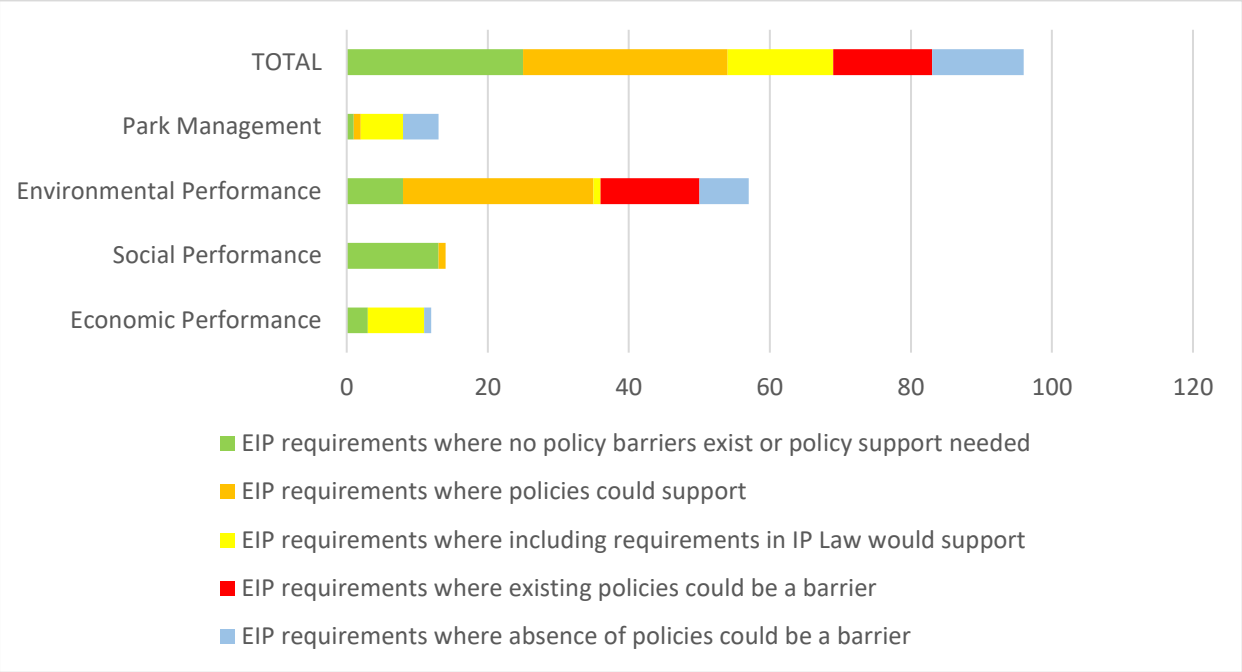


Table 2 and Figure 4 show that, overall, for about one third of the EIP requirements government policies will not affect – positively or negatively – their implementation.[5] If one considers that EIP requirements can also be implemented even if the supportive policies are not in place – it might be more difficult for tenant firms and the park management entity to implement them, but not impossible – then the portion of EIP requirements that can be implemented without policy intervention (the sum of the green, orange, and yellow bars in the Figure, the sum of the first three rows in the Table) grows considerably, to somewhere in the region of two-thirds to three-quarters. It is only a minority of EIP requirements – one quarter to one third – where existing policies, or a lack of policies, could actually stymie their implementation, if not impede it completely.[6]

The picture changes considerably when one focuses on the individual groupings of EIP requirements:

- In the case of the EIP requirements related to social performance, they could all be implemented even in the absence of supportive policies, although in a small number of cases such policies could help.
- In the case of the EIP requirements related to economic performance, with the exception of one case where the absence of policies could impede implementation, they could also all be implemented even in the absence of supportive policies – although in a good number of cases, where a country has a law regulating the creation of industrial parks it

[5] 25 EIP requirements fall into this category. Since in nearly all cases, the EIP requirements in question have only one category assigned to them, this number can be compared to the total number of EIP requirements – 64.

[6] Only ranges can be cited, because of the fact that a number of the EIP requirements involved in this count have been assigned more than one category.

would help park management entities implement if that law integrated into it the EIP requirements.

- In the case of EIP requirements related to park management, there are a good number of requirements where the absence of policies could impede implementation. In all the other cases, the requirements could be implemented even in the absence of supportive policies – although as with the previous group there are a good number of requirements where, in countries which have a law regulating the creation of industrial parks, it would help park management entities implement if the law integrated into it the EIP requirements.
- The last grouping, the one related to environmental performance, is where there are the most significant concerns. It is here that one finds all cases where existing policies could be a barrier to implementation. Here too are a significant number of cases where the absence of policies could be a barrier to implementation. All told, this affects nearly half (14 out of 30) of the EIP requirements in this group. As in the other cases, the other half could be implemented even in the absence of supportive policies – although, as we shall see, supportive policies could be very helpful with this particular group of EIP requirements. A possible reason for this situation is that the implementation of the environmental requirements requires a greater reliance on external factors, which policies can then affect, both positively and negatively.
- The next four chapters contain a more detailed analysis of the specific cases where policies could be acting as barriers to the implementation of EIP requirements (chapters 4 and 5) or where they could be supporting the implementation of the EIP requirements (chapters 6 and 7). In most cases, the text of the relevant requirements are cited to show more clearly the connection to policies.

4 EXISTING POLICIES AS A BARRIER TO IMPLEMENTATION

There are a number of cases where laws and regulations which a country has passed could act as a barrier to park management entities and/or tenant firms implementing EIP requirements. These cases are discussed in detail below. The great majority of them relate to potential barriers created by waste management laws, but there are also potential barriers in laws governing Environmental Impact Assessments (EIAs) and laws promoting renewable energy.

In most cases, the text of the relevant requirements are cited to show more clearly the connection to the policy barrier. Note that, for the sake of clarity, since many of the requirements cover multiple topics, the texts of the requirements have been edited to give only the most relevant portion of the requirements, with deleted text shown as ellipses […]). The full texts of the requirements can be found in Annexes B and C.

In many cases, recommendations are given as to how to eliminate the barriers, or at least reduce their severity. These recommendations are *italicised*.

4.1 BARRIERS TO THE PROMOTION OF CIRCULAR ECONOMIES

In the case of industrial parks, industrial synergies will be perhaps the most common way for these parks to implement circular economy practices. The term "Industrial Synergies" covers a number of activities where the park management entity and the tenant firms draw joint benefits from co-location and proximity. The most common forms of industrial synergies in an industrial park include:

- Supply synergies and co-location of suppliers and clients: Co-location and clustering of tenant firms involved in common supply and value chains (e.g., producers and suppliers of raw materials, fabricators, manufacturing, business clients).
- Service synergies: tenant firms share services and activities (e.g., joint training of staff and sharing of maintenance contractors).
- Utility synergies and infrastructure sharing: tenant firms and park management entities share the use of utility infrastructure, mainly revolving around water and energy (e.g., water recovery and energy cogeneration).
- By-product synergies and waste exchanges i.e. "Industrial Symbiosis": an industrial facility which previously was disposing of a waste (solid, liquid, or gas) now sells it as a raw material to another facility, thus turning what was once waste into a valuable by-product.
- Urban-industrial synergies: Interlinkages and collaborations between tenant firms and cities or municipalities on the collection, processing and reuse of materials, wastes, energy and water streams; this is closely related to industrial symbiosis.
-

Several of the EIP requirements promote explicitly or implicitly the adoption of circular economy practices through the last four of these five forms of industrial synergies. Yet various policies adopted by governments, primarily but not exclusively in the realm of waste management, could potentially be barriers to the uptake by industrial parks of these circular economy practices. In the following sections, the specific circular economy practices of Industrial Symbiosis, Recycling and Remanufacturing are discussed.

4.1.1 BARRIERS TO INDUSTRIAL SYMBIOSIS

Uptake of industrial symbiosis projects by industrial parks can particularly suffer from policy barriers. In the context of an industrial park, industrial symbiosis can involve the following:

- One factory selling its wastewater to another factory, which, after the necessary cleaning (if any), will reuse the water in its processes or as a cooling or heating medium.
- One factory selling its solid waste to another factory, which, after some processing (if any), will use the waste as a raw material in its production processes.
- One factory selling its waste energy (often in the form of low-grade heat or hot water) to another factory, which will use it as a source of energy for its processes.

Industrial symbiosis can take place between two tenant firms located inside an industrial park. In this case, all three types of symbiosis described above can take place. Alternatively, tenant firms could be selling their waste to a firm outside of the park, or buying waste from such a firm. They could even be buying the waste from a municipality, as a form of urban-industrial synergy. This type of longer-distance exchange overwhelmingly involves solid waste, which is easier to transport over long distances, although there are also cases of tenant firms selling their wastewater or their waste energy to firms in local communities or to the municipalities themselves.

Of these three types of industrial symbiosis, it is the EIP requirements involving wastewater and solid waste which could be impeded by existing government policies.

WASTEWATER

The EIP requirements involving the reuse of wastewater are as follows:

No.	Description/Requirement	Prerequisites/Evidence – Performance Indicator
15	Water-… re-use plans are important to reducing total water consumption and manage water use. … The park and firms should have systems in place to increase water … reuse.	Park management entity has operational plans to increase water reuse in next five years. This would be achieved by … reuse of industrial effluents ...
31	The industrial park has provisions in place to appropriately … recycle and reuse treated wastewater. …	…
32	The park and firms have systems in place to in-crease water … reuse.	Proportion of total industrial wastewater from firms in the park that is reused responsibly within or outside the industrial park.

The potential policy barrier in this case is that countries have enacted laws which prohibit the reuse of industrial wastewater for any other use. The concern of the lawmakers is that the reuse of industrial wastewater could lead to contamination due to the pollutants present in the wastewater. The lawmakers are primarily concerned with the reuse of industrial wastewater in agriculture – soil contamination from the pollutants in the industrial wastewater – or in homes – health and safety concerns for the consumer. But the prohibition can be a blanket one, covering all possible reuses of industrial wastewater. This is the case in **Indonesia**, for instance.

There is a relatively simple way of removing this barrier. The original law can be amended to say that the reuse of industrial wastewater is prohibited unless and until it meets certain quality criteria; these quality criteria are then published in later government regulations.

Note that another type of barrier can spring up here, where the *lack* of a government policy – in this case, the fact that these later government regulations are very tardily published, if they are published at all – becomes the barrier. This issue is taken up again below, in section 5.2.1.

SOLID WASTES – NON-HAZARDOUS

The EIP requirements involving the reuse of solid, non-hazardous, waste are as follows (the case of hazardous waste is discussed in the next section):

No.	Description/Requirement	Prerequisites/Evidence – Performance Indicator
19	Waste generated in the production process is recovered, as far as possible, through sorting, cleaning, conditioning etc., so that it can be used as raw material for other firms in and outside of the park.	…
33	A waste management plan with a program/ mechanism in place to promote and encourage reuse and recycling of materials by firms in the park (for ex-ample, raw materials for process and non-process applications)	Proportion of non-hazardous, solid industrial waste generated by firms that is reused-recycled by other firms, neighbouring communities, or municipalities.
18	The park management and firms are obliged to consider circular economy principles and practices (e.g. … making extensive use of secondary/recycled materials generated in the park).	…
35	Circular economy practices (e.g., Industrial Symbiosis Networks, Exchange Platforms for waste and secondary raw materials, for reuse and recycling, etc.) are in place and used by firms. …	Proportion of manufacturing firms adopting circular economy practices, including engagement in Industrial Symbiosis Networks in the park; or actively exchanging secondary raw materials, or waste, …

The potential policy barrier in this case springs from the philosophy common to many waste management laws of strictly regulating the transfer of solid wastes from the generators to other entities for recycling, treatment or disposal. The rules are generally more stringent with respect to industrial wastes, which are considered to be potentially more dangerous. The laws establish an authorisation system, requiring recycling companies, treatment companies, disposal companies (and also the companies transporting the wastes) to be authorised by government to undertake these activities. Entities which are not so authorised are prohibited from taking and handling wastes.

Unless exempted (see below), the reuse of industrial solid wastes is subject to these authorisation requirements. Thus, a firm wishing to take the wastes generated by another firm so as to reuse them will need obtain an authorisation allowing it to take them. These authorisations are often onerous, both financially and non-financially (in terms of the "red tape" involved), and normal industrial operations (i.e., enterprises whose business model is not the recycling, treatment, and disposal of wastes) will be (very) reluctant to obtain the authorisations. This could severely restrict the uptake of industrial symbiosis in industrial parks.

There are ways of removing this barrier. Waste management laws can include exemptions from the waste management requirements by distinguishing industrial residue streams which, with little if any processing, can be reused as a raw material and stating that such streams are not waste (and therefore not subject to the authorisation requirements). A good example of such an exemption is contained in the EU's Waste Framework Directive.[7] Article 5 of that Directive states that a "substance or object" (the Directive's term for a residue) is considered to be a "by-product" and not a "waste" if:

a) further use of the substance or object as a by-product is certain; and
b) the substance or object can be used directly as a by-product without any further processing other than normal industrial practice; and
c) the substance or object is produced as an integral part of a production process; and
d) the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

Any two firms, one the generator of the residue and the other its reuser, which can make this showing can enter into an industrial symbiosis agreement without the firm reusing the residue having to obtain an authorisation (and without the transporter of that residue having to also obtain an authorisation). Note that this exemption is not completely free of administrative burden since the two firms would still have to maintain the necessary evidence to make the showing required by the law to any inspector.

Note that this kind of exemption does not cover recycling, which the EIP requirements tend to treat as equivalent to reuse (see, e.g., in the table above the use of the phrase "reused-recycled"). Recycling tends to require much more processing to extract the desired secondary raw materials and there are generally considerable amounts of secondary waste generated. Especially because of the generation of these new waste streams, recycling operations – especially those relating to

[7] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on Waste and Repealing Certain Directives
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-20180705

industrial wastes – will always need to be covered by authorisation systems (although they can be made less burdensome).

Note also that in some legal and regulatory regimes, the issue of liability could be a barrier. In these cases, the waste generator is considered to be liable for any impacts on health and the environment which might be caused by their wastes, even after they have transferred those wastes legally to other parties who will reuse, recycle, treat or dispose of them. This could make generators hesitant to transfer their waste to another company using the waste to make a product, in case the use of the product could cause impacts attributable to their waste (e.g., heavy metals in their waste and present in the product were responsible for some impact on human health and the environment). This barrier could only be removed if there were some way for the generator to legally transfer their liability to the reuser of the waste.

4.1.2 BARRIERS TO THE REUSE OF TOXIC AND HAZARDOUS WASTES

In the case of toxic and hazardous wastes, the barrier takes a different form; there is a blanket prohibition on the reuse of these wastes. The EIP requirements which are impacted by this are listed below – note that they cover both hazardous materials and hazardous wastes together[8]:

No.	Description/Requirement	Prerequisites/Evidence – Performance Indicator
17	Tenant firms are obliged to make as little use as possible of hazardous materials in their production process; to generate as little hazardous waste as possible, and to seek alter-native materials.	Obeying the principles of good practices for the management of hazardous materials and waste as part of legally binding agreements.
34	Program/mechanism in place with clear targets to reduce, and avoid the use of, dangerous and hazardous materials by firms in the park.	Proportion of firms in park, which appropriately handle, store, transport and dispose of toxic and hazardous materials.

The EIP requirements make no mention of the possibility of reusing (or even recycling) toxic/hazardous wastes. In this, the requirements appear to be mirroring certain national waste management regimes, which prohibit the reuse of such wastes. This is the case, for instance, in **Indonesia's** waste management law. These kinds of prohibitions create a barrier to industrial symbiosis projects using toxic/hazardous wastes. There are perfectly acceptable reuse options for such wastes. For instance, waste hydrocarbon solvents can often be reused with little if any processing as a fuel; certain types of wastes containing zinc can be reused with little if any processing in the manufacture of fertilisers.

[8] There is a logic to merging the requirements for hazardous materials and hazardous waste together: in many cases, it is the hazardous materials which, when they become waste, create the hazardous waste. However, from a policy point of view this merger can be somewhat tricky since traditionally the management of hazardous materials and of hazardous waste are covered by different policy regimes.

Where this barrier exists, the simplest way to remove it is to amend the relevant law so that toxic and hazardous wastes can be managed in the same ways as non-hazardous waste, i.e., they can be reused (and recycled), as well as treated and disposed.

Note that, depending on how the law is written, this might then lead to hazardous wastes now suffering from the previous barrier discussed, i.e., any entity wishing to reuse hazardous wastes having to be authorized as a waste management company.

The relevant government authorities might consider this option to be too risky or see it as going against the philosophy of putting the focus on reducing the amount of toxic/hazardous wastes which are generated (and toxic/hazardous materials which are used) – this is certainly the logic behind the EIP requirements in the table above.

In this case, another way that the barrier can be minimised – rather than removed – is by amending the law and the implementing regulations which contain the methodology that defines which wastes are to be considered toxic/hazardous. The amendment would allow companies which generate wastes considered toxic/hazardous but which also have a good potential for reuse, to request approval from the government to manage these wastes as if they were non-hazardous. This is essentially the approach which has been adopted by ***Indonesia****.*

4.1.3 ISSUES SPECIFIC TO FREE TRADE ZONES

Free Trade Zones (FTZs) or their equivalent could face a specific barrier to implementing industrial symbiosis projects where the waste is generated in the zone and is being sent to a reuser located outside the zone, or vice versa. FTZs or their equivalent are parks where raw materials or parts are imported into the zone from another jurisdiction, where these raw materials or parts are used to manufacture a product, and where that product is then re-exported to another jurisdiction, this all this taking place under specific customs regulations where neither the imported materials/parts nor the final products are subject to customs duties. Because of these fiscal advantages, there are strict controls about the raw materials, parts, and products which can exit the FTZ and enter the rest of the country's economy and vice versa. These controls of material flows across the FTZ fence could well cover wastes being transported into and out of the FTZ, especially where those wastes are paid for as a raw material, which would be the case with an industrial symbiosis project. The rules establishing the FTZ could well prohibit this kind of exchange of waste. The possibility of this happening has been flagged, for instance, in **Colombia**.

It may be difficult to eliminate this barrier. It may be impossible to allow the entry of a waste from the rest of the economy into the FTZ, which is paid for (as it should be, since it would be used as a raw material), since this would go completely against the basic concept of an FTZ as a place where the raw materials used there come from an external jurisdiction. On the other hand, allowing a waste to exit the FTZ and to enter the rest of the economy might be feasible. The rules establishing FTZs would need to create a process whereby a generator of a waste in the FTZ can request special permission to send the waste to a reuser outside the FTZ, with the proviso that the generator would need to pay customs duties on that transaction as if the waste were entering the country from abroad.

4.1.4 BARRIERS TO REMANUFACTURING

Industrial symbiosis is one important way in which industrial parks could implement circular economy practices. Another way they could implement circular economies is to have tenant firms which become hubs for remanufacturing (or the closely related activities of refurbishing and reconditioning).

Remanufacturing is the process whereby a used product is completely disassembled, all its parts are cleaned, any worn or broken parts are replaced (with a combination of reused, repaired and new parts), any software is updated, and then the product is reassembled. The reassembled product is tested to ensure that it meets or exceeds the product's original performance specifications when it was new. Because it meets the Original Equipment Manufacturer's (OEM's) original performance specifications, the remanufactured product carries a warranty that is equivalent to that of a new product: it is "as good as new". Because a remanufactured product is equivalent to a new product, the OEMs normally run remanufacturing processes: remanufacturing is an integral part of their business model. Refurbishing and reconditioning are less high quality versions of remanufacturing. Consequently, the warranty is not so good and the OEMs are often not involved at all.

Two EIP requirements promote remanufacturing as one possible circular economy practice in parks:

No.	Description/Requirement	Prerequisites/Evidence – Performance Indicator
18	The park management and firms are obliged to consider circular economy principles and practices (e.g. … remanufacturing of components and parts …).	…
35	Circular economy practices … are in place and used by firms. Circular economy practices consist of … c) collecting back and remanufacturing products or parts and components of products.	….

However, remanufacturing operations can face several barriers. The first springs once again from waste management laws. As mentioned above, the starting point of remanufacturing is a used product, or more often a component of a used product, e.g., the engine of an automobile, what in the remanufacturing business is referred to as the "core". In most waste legislation, cores would be considered waste, because they are no longer used and are discarded. But, as explained above in section 4.1.1.2, this would mean that a remanufacturer would be considered a waste management company and would have to be authorised as such. In addition, the transport of the cores to the remanufacturer would have to be undertaken by a company which has been given the authorisation to transport wastes. All this would add to the burdens, financial and non-financial, of remanufacturing.

This barrier can be removed by having the waste management laws or their implementing regulations specifically exempt cores from the definition of what is a "waste" or by subsuming cores into definitions of "by-products" as opposed to "wastes" (see above, section 4.1.1.2).[9]

[9] Another way some OEMs have attempted to avoid cores falling into definitions of "waste" is to have a significant deposit on the core when it is first sold, arguing that the core therefore still has value and is thus not a waste. In some jurisdictions (notably the EU),

A second barrier which remanufacturing can face reflects the global nature of the remanufacturing market. Many cores, i.e., the component of a product being remanufactured – see above, are traded across borders, being collected, for instance, across a whole region and being brought to a remanufacturing hub for that region. In some jurisdictions and for a variety of reasons, the import of cores can be restricted, by being subject to tariffs or other restrictions, or even banned (and the export of remanufactured products also restricted or banned).

The removal of this barrier really requires that the government be persuaded that remanufacturing is a type of business which should be encouraged. If the government can be so persuaded, then it will be in the government's own interest to remove any barriers to the import of cores (and export of remanufactured products).

4.2 OTHER BARRIERS CREATED BY EXISTING POLICIES

While barriers to the uptake of circular economies, primarily created by waste management policies, are the major form of barriers created by existing policies to the implementation of EIP requirements, there are three other, miscellaneous, barriers potentially created by existing policies.

4.2.1 BARRIER CAUSED BY ENVIRONMENTAL IMPACT ASSESSMENT REQUIREMENTS

The actions expected from the park management entity in the EIP requirement cited below would flow naturally from the implementation by parks of an Environmental Impact Assessment (EIA).

No.	Description/Requirement	Prerequisites/Evidence
23	The industrial park demonstrates an understanding of the potential impact of park activities on priority ecosystem services in and around the vicinity of the park, and takes needed actions.	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.

Many countries now have laws requiring new enterprises and other commercial entities – often above a certain size, or in certain sectors, or using certain hazardous materials – to undertake EIAs before they are given their license to operate. For instance, all the countries involved in GEIPP have EIA requirements.

With respect to industrial parks, the critical issue is if only the park management entity should carry out EIAs for the park as a whole, or if instead each new tenant firm should *also* carry out EIAs for their individual business operations when they first locate in the park. Which option is chosen makes a considerable difference in the overall costs of carrying out EIAs. In the first case, since few if any of the tenant firms are in place at the beginning of a park's life – when the EIA is carried out – park management entities base their EIA on predictions of what type of tenant firms will be entering the park. Whenever new tenant firms arrive (or old tenant firms leave), park management entities submit a formal update of the park's EIA to the relevant authorities. The

the courts have rejected the argument that a waste is something with no value, arguing that even something with value can be a waste.

cost of this update is low. However, if a new tenant firm arrives which substantially changes the initial assumptions about the types and/or sizes of the park's environmental impacts, then the park management has to request a formal re-approval of the EIA by the relevant government authorities. This is the procedure used, for instance, in **Indonesia** and **South Africa**. Essentially, in this case, tenant firms do not have to shoulder the burden of carrying out an individual EIA, and the costs of servicing the park's overall EIA, which park management entities would charge to its tenant firms, would be modest. In the second case, each new tenant firm also has to bear the costs of undertaking an EIA specific to their business. This is the procedure used in **Peru**, for instance. In addition to the additional costs this approach imposes, having a series of individual EIAs would make it difficult for the authorities to ensure a coordinated response to the park's overall environmental impacts.

In countries where the latter approach is used in their EIA laws, it is suggested that park management entities, or the investors in parks, initiate a dialogue with the government to modify these laws (or their implementing regulations) to adopt the former approach.

4.2.2 BARRIER TO THE INSTALLATION OF RENEWABLE ENERGY SYSTEMS IN THE PARK

With respect to the promotion of renewable energy (RE), as described in the EIP requirement below there is an expectation that the tenant firms and the park management entity commit to the installation of RE systems:

No.	Description/Requirement	Performance Indicator
28	The industrial park leverages available renewable generation sources, with plans to increase contribution for shared services (for example, solar street lamps).	Total renewable energy use for electricity and heat production in the industrial park is equal to or greater than the renewable energy share in the annual national electricity mix in the grid.

However, energy laws in the country can create a barrier to a park's efforts here, by limiting the size of RE systems which can be installed. This is currently the case in **Indonesia** and **Viet Nam**, for instance, where the maximum size of RE systems which the relevant laws allow non-energy utilities to install is quite small, with enterprises in industrial parks being able in principle to host bigger systems.

Removing this barrier will be difficult. The principal reason for such size limits is a reluctance by governments to allow too many independent power producers into the market. This is a political position which would require a national dialogue over a number of years to change.

4.2.3 BARRIER TO A CENTRALISED WASTE TREATMENT OPERATION IN THE PARK

As is the case for many of the barriers described in section 4.1, the barrier described here has its roots in waste management policies. But in this case, the barrier is linked to the burdens imposed by the waste management authorisation system.

As described in the EIP requirement shown below, there is an expectation that eco-industrial parks should have some sort of facility for treating or at least managing and sorting wastes which are generated in the park:

No.	Description/Requirement	Prerequisites/Evidence
19	Waste generated in the production process is recovered, as far as possible, through sorting, cleaning, conditioning etc., so that it can be used as raw material for other firms in and outside of the park.	A central park facility or other mechanism is in place to treat waste that cannot be processed by individual firms.

Depending on the types of wastes which are generated in the park and the waste management legislation which is in force in the country, this "central park facility or other mechanism" could well require authorisation as a waste treatment facility. As has already been mentioned several times, the requirement to have an authorisation is a burden, both financial and non-financial. A park management entity could be extremely reluctant to take on this responsibility, especially since waste management is not its core business. This could be a barrier to the park meeting this particular EIP requirement.

If such a facility would indeed need to be authorised, a possible solution could be to enter into an agreement with a waste management company which is familiar with the authorisation system and have that company be responsible for the EIP's central facility.

5 ABSENCE OF POLICIES A BARRIER TO IMPLEMENTATION

In contrast to the cases described in the previous chapter, there are a number of situations where the *absence* of a law, or (more commonly) a technical regulation which implements the law, could pose a barrier to the implementation of EIP requirements.

These cases have been clustered into three groupings:

- Barriers which flow from a lack of implementation by government of provisions in the park's Master Plan.
- Barriers which are due to governments not passing regulations required to fully operationalise laws.
- Other, miscellaneous barriers.

In most cases, the text of the relevant requirements are cited to show more clearly the connection to policies. Note that, for the sake of clarity, since many of the requirements cover multiple topics, the texts of the requirements have been edited to give only the most relevant portion of the requirements, with deleted text shown as ellipses […]). The full texts can be seen in Annexes B and C. As in the previous chapter, where recommendations are given as to how to eliminate or reduce the barriers, they are *italicised*.

5.1 BARRIERS FROM AN IMPROPER IMPLEMENTATION OF THE PARK'S MASTER PLAN

Several barriers to the full implementation of an EIP can arise if the relevant government authorities do not implement their "side of the bargain" in the design of an industrial park.

5.1.1 ABSENCE OF (SUFFICIENT) EXTERNAL INFRASTRUCTURE

As described in the EIP requirement below, there is an expectation that the tenant firms in an EIP will have access to all the infrastructure they need:

No.	Description/Requirement	Performance Indicator
64	An EIP should be "investment ready" … Essential infrastructure services should be offered by the industrial park, including access to water, energy, roads, and service corridors.	…

The investors behind the park have to ensure that the necessary common infrastructure networks within the park are constructed (one form of industrial synergies – see the chapeau to section 4.1). But equally importantly, the government has to ensure that the necessary infrastructure networks – the power lines, the water lines, the roads – have been brought to the park's boundary fence so that the internal networks can hook up to them. This is not always the case; it has been flagged in **South Africa**, for instance, as an issue. If the government does not

bring the necessary – or enough of the necessary – infrastructure to the park's boundary fence, it will place a very significant barrier to the park's economic sustainability.

This is an issue which requires careful consideration at the planning stage of the park. The relevant government authorities need to be involved in the planning of the new park, so that they know the long-term infrastructure needs of the park, and then they need to plan the necessary budgetary commitments to ensure that infrastructure requirements of the park will be satisfied. This is reflected in the EIP requirement regarding master planning:

No.	Description/Requirement	Prerequisites/Evidence
7	A master plan for the EIP is developed by park developers and is applicable to both planning and operations by park managers.	A Master Plan (or equivalent planning document) for any new and existing industrial park has been developed …, including the following core elements: - … essential and efficient infrastructure (onsite and offsite …), utilities, transportation network; … - ….

5.1.2 ABSENCE OF (SUFFICIENT) DECENT HOUSING FOR THE WORKERS

As described in this same EIP requirement regarding master planning, there is an expectation that all the workers in an EIP will have access to decent housing:

No.	Description/Requirement	Prerequisites/Evidence
7	A master plan for the EIP is developed by park developers and is applicable to both planning and operations by park managers.	A Master Plan (or equivalent planning document) for any new and existing industrial park has been developed …, including the following core elements: - … essential and efficient infrastructure (onsite and offsite, in particular ensuring access to decent housing), … - …

Since all workers' housing will normally be located outside the park, in the surrounding community, this aspect of the Master Plan can only be satisfied if the relevant government authorities ensure, through their zoning laws and construction permits, that sufficient housing is made available for all the workers which the park will be employing. There is evidence that this is not always the case, thus creating a barrier to a park's ability to implement all of the EIP requirements.

Once again, this issue requires careful consideration at the planning stage of the park. The relevant government authorities need to be involved in the planning of the new park, so that they know the long-term housing needs of the park, and then they need to make the necessary budgetary commitments to ensure that the park's housing requirements for its workers will be satisfied.

5.1.3 INSUFFICIENT LAND FOR COMMON AREAS IN AND ADJOINING THE PARK

As described in the same EIP regarding master planning, there is also an expectation that industrial parks will be given sufficient land not only to house the planned number of tenant firms but also to allow space for common infrastructure as well as buffer zones around the park:

No.	Description/Requirement	Prerequisites/Evidence
7	A master plan for the EIP is developed by park developers and is applicable to both planning and operations by park managers.	A Master Plan (or equivalent planning document) for any new and existing industrial park has been developed …, including the following core elements: - … essential and efficient infrastructure …, utilities, transportation network; … buffer zone around the park; … - …
24	The industrial park demonstrates an understanding of the potential impact of park activities on priority ecosystem services in and around the vicinity of the park, and takes needed actions.	The park management implements measures to protect biodiversity, and protects or creates natural/recreational areas in … the park.

If industrial parks are not allocated sufficient land to house the common infrastructure, the buffer zones, and the zones for natural/recreational areas which an EIP needs, then this will create a serious barrier to an IP becoming an EIP. This, for instance, has been flagged as an issue in **Indonesia** and **South Africa**. It could be particularly problematic for existing IPs, which were established in the past, which are interested in obtaining EIP status, but may never be able to do so because they lack sufficient space to do so.

This suggests that very careful consideration needs to be given at the planning stage of a park to ensure that the relevant government authorities allocate sufficient land to new parks, including the possibility of a future expansion of the park if the economic conditions support this.

5.1.4 INSUFFICIENT LAND FOR BIODIVERSITY PROTECTION

As described in the EIP requirement below, there is also an expectation that the park will be protecting biodiversity outside the park as well:

No.	Description/Requirement	Prerequisites/Evidence
24	The industrial park demonstrates an understanding of the potential impact of park activities on priority ecosystem services in and around the vicinity of the park, and takes needed actions.	The park management implements measures to protect biodiversity, and protects or creates natural/recreational areas … surrounding the park.

However, there can be barriers to the implementation of this requirement. Unless parks purchase land outside the park – something which will increase their overheads – it will be up to the relevant government authorities to allocate land outside the park where the park can create natural/recreational areas, or to give the park formal permission to protect such areas where they already exist outside the park. Otherwise, it will be difficult for the park to meet this particular EIP requirement.

Here again, very careful consideration needs to be given at the planning stage of a park to ensure that the relevant government authorities allocate sufficient land outside the park where the park can protect or create natural/recreational areas.

5.2 BARRIERS FROM A FAILURE TO PASS LAWS' IMPLEMENTING REGULATIONS

Several barriers to the full implementation of an EIP can arise if the relevant government authorities do not put in place the necessary regulations to fully operationalise existing laws.

5.2.1 BARRIER TO THE REUSE OF INDUSTRIAL WASTEWATER

As already discussed above in section 4.1.1.1, the reuse of the park's wastewater is promoted in several of the EIP requirements.

No.	Description/Requirement	Prerequisites/Evidence – Performance Indicator
15	Water-… re-use plans are important to reducing to-tal water consumption and manage water use. … The park and firms should have systems in place to increase water … reuse.	Park management entity has operational plans to increase water reuse in next five years. This would be achieved by … reuse of industrial effluents ...
31	The industrial park has provisions in place to appro-priately … recycle and reuse treated wastewater. …	…
32	The park and firms have systems in place to in-crease water … reuse.	Proportion of total industrial wastewater from firms in the park that is reused responsibly within or outside the industrial park.

In section 4.1.1.1, the concern was a blanket prohibition on the reuse of industrial wastewater. It was noted there that a relatively simple way of removing this barrier exists, namely by prohibiting the reuse of industrial wastewater unless and until the promulgation of regulations listing the quality criteria which the wastewater must first meet.

However, the fact that the lifting of the prohibition on wastewater reuse is linked to a follow-up set of regulations means that another type of barrier can spring up here. Given the slowness with which regulations are sometimes promulgated by government, the prohibition on industrial wastewater reuse, which is meant to be temporary, can actually stay in place for a long time. This is the case in **Viet Nam**, for instance, where the necessary quality criteria allowing the reuse of industrial wastewater have yet to be published, thus effectively blocking such reuse in that country.

The way to remove this barrier is obvious: the government needs to speed up its work in passing the regulations listing the necessary quality criteria. However, this might require some outside pressure, from industrial associations, for instance, whose members are also suffering from the de facto ban on the reuse of their wastewaters.

5.2.2 BARRIER TO ENSURING SUSTAINABLE LEVELS OF WATER EXTRACTION AND USE

As described in the EIP requirement below, there is an expectation that the tenant firms and the park management entity in an EIP are extracting (and consuming) water at sustainable levels:

No.	Description/Requirement	Performance Indicator
30	… Extraction from water sources (such as rivers and groundwater sources) occurs at sustainable levels.[5]	…
5. Sustainable levels refer to the rights/concessions allocated to incentivise lower water usage as compared to the business-as-usual baseline.		

The footnote to this requirement makes it clear that what is considered a sustainable level of water extraction is defined in the water use rights or water concessions which the relevant government authorities have allocated to the park. This in turn assumes that the government authority has in place a methodology to ensure that the water rights or concessions which it allocates are indeed sustainable given the availability of water in the region and the other competing demands on that water.

If the laws governing water allocations do not require the authorities releasing concessions/rights to undertake such analyses of water supply and demand, or if these authorities have failed to undertake them, it will be difficult for a park to make the showing that the water which it consumes is being extracted at sustainable levels.

The best way out of this difficulty would be for the park management entity to offer the authority releasing the concessions/rights to undertake together the necessary analysis, to arrive at a water concession for the park that both parties can agree is sustainable. Again, the best moment for undertaking such an exercise would be during the planning stage of the park.

5.2.3 BARRIER TO PROPER TREATMENT AND DISPOSAL OF WASTE

As described in the EIP requirement below, there is an expectation that the tenant firms in an EIP are ensuring that any wastes which are not being reused or recycled are being properly treated or disposed:

No.	Description/Requirement	Performance Indicator
36	A waste management system … which correctly manages unusable waste materials (e.g., disposed of in proper landfills, burned in proper incinerator).	Waste generated by firms in the industrial park which is safely disposed of. ...

As already mentioned several times above, most national waste management laws ensure the availability of proper treatment and disposal sites through an authorisation system. The government authorises waste management sites to undertake certain types of treatment for certain kinds of waste and/or to dispose of certain kinds of waste in a landfill.

If the government has not given out sufficient authorisations to satisfy a park's demand for proper waste treatment or disposal, or if the authorisations do not cover the types of wastes which are being generated in the park, it will be difficult for a park to make the showing that all the wastes not being reused or recycled which are leaving the park are being properly treated and disposed.

The short-term solution to this difficulty would be for the park management entity to make it a condition of acceptance of any new tenant firm that the latter can show that there is adequate

authorised treatment and disposal capacity in the immediate region to take the unusable wastes which it will be generating. In the longer term, if the lack of authorised waste treatment and disposal facilities is a problem, park management entities need to engage with the waste management industry sector to find a long-term solution (which might require jointly approaching the relevant authorities to persuade them to speed up the process of emitting the necessary authorisations).

5.3 OTHER BARRIERS CREATED BY THE ABSENCE OF POLICIES

5.3.1 BARRIER TO IMPLEMENTATION OF CIRCULAR ECONOMY PRACTICES

As described in the EIP requirement, there is an expectation that the tenant firms and the park management entity will implement circular economy practices. One of the practices suggested is to use as little virgin raw material as possible, substituting these with secondary raw (recycled) material.

No.	Description/Requirement	Prerequisites/Evidence
18	The park management and firms are obliged to consider circular economy principles and practices (e.g. … using as little virgin raw material as possible …).	…

However, there is a general barrier to a shift from virgin raw materials to recycled materials, namely subsidies which governments over the decades have provided to many virgin raw materials. These subsidies artificially reduce the price of raw materials, making it more difficult to make the economic case for a shift to recycled materials. The most significant subsidies are those given to fossil fuels (which act as a barrier to the uptake of renewable energy systems), but other important subsidies for raw materials also exist.

This suggests that as parks undertake the circular economy assessments required by this requirement, in cases where a shift from virgin raw materials by tenant firms to recycled raw materials is identified as a possible option, but where existing subsidies on the virgin raw materials are found to be an important barrier to the shift, the affected tenant firms (and/or the park management entities as their spokesperson) should enter into a dialogue with the government to work on removing the offending subsidies. Parks should ally themselves with the producers of the recycled materials since it is also in their interest that such subsidies be removed.

5.3.2 BARRIER TO ENSURING THE FINANCIAL SUSTAINABILITY OF THE PARK MANAGEMENT ENTITY

As described in the EIP requirement below, there is an expectation that the park management entity will have the legal right to charge fees for the services which it renders to the tenant firms, so as to allow it to provide the services in a financially sustainable manner:

No.	Description/Requirement	Performance Indicator
8	… park management entity is empowered to provide and charge fees through a legally binding instrument.	Proportion of firms in the industrial park to have signed a residency contract/park charter/code of conduct (depending on what is legally binding on park firms according to the existing legislation in the

		country[2]) and additional legally binding arrangements that empower the park management entity to perform its responsibilities and tasks and charge fees … for common services. …
2. In most developing countries, a park's charter or code of conduct may not be a legally binding instrument. Therefore, it would not provide the park management entity with the necessary powers.		

As is pointed out in the footnote to this requirement, a park's charter or code of conduct may actually not be a legally binding instrument, especially in developing countries. The footnote goes on to say that in these cases park management entities would not have the necessary powers to charge fees. This would be a significant barrier to their overall financial sustainability as well as to the financial viability of the park as a whole.

In cases where this concern holds, park management entities – and/or a park's investors – need to enter into a dialogue with the relevant authorities to amend the relevant law(s) so that the residency contracts/park charters/codes of conduct become legally binding instruments.

6 SUPPORTIVE POLICIES TO HELP IMPLEMENTATION

The previous two chapters covered cases where existing policies, or the lack of policies, could create a barrier to the implementation of certain EIP requirements. In this chapter, the focus will be instead on cases where the existence of policies could support industrial parks in their implementation of the EIP requirements.

These policies have been clustered into five groupings:

- Where governments could support the implementation of EIP requirements through the publication of official guidance documents.
- Where governments could support the implementation of EIP requirements by making training and knowledge dissemination programmes available.
- Where governments could support the implementation of EIP requirements by having programmes making "cheap money" available for investments in the necessary infrastructure, technologies, and equipment.
- Where governments could support implementation of EIP requirements by having programmes supporting R&D needed to identify and properly characterise options for improvement, where such options are not currently well known.
- Where governments could support the implementation of EIP requirements by having programmes that ensure parks have a sufficient supply of accredited third-party providers of specialist services.

In most cases, the text of the relevant requirements are cited to show more clearly the connection to policies. Note that, for the sake of clarity, since many of the requirements cover multiple topics, the texts of the requirements have been edited to give only the most relevant portion of the requirements, with deleted text shown as ellipses […]). The full texts can be seen in Annexes B and C.

As in the previous chapters, any recommendations given about the specific supportive policies to adopt are *italicised*.

6.1 PUBLICATION OF OFFICIAL GUIDANCE DOCUMENTS TO SUPPORT IMPLEMENTATION OF EIP REQUIREMENTS

There are a number of cases where it could be very helpful if the relevant government authorities could publish guidance documents, Standard Operating Procedures (SOPs) or similar documents, which tenant firms and park management entities could base themselves on in their implementation of EIP requirements (note that such guidance documents would generally help all enterprises, whether inside industrial parks or outside them).

In some cases, these guidance documents could be elevated to legally binding requirements, by taking the form of regulations.

The EIP requirements in question are described in more detail below.

1) **Requirement no. 7**: Among the requirements for a Master Plan, there is the expectation that park management entities have procedures in place governing the location within the park of any high-risk industries which they might have among the park's tenant firms.

Description/Requirement	Prerequisites/Evidence
A master plan for the EIP is developed by park developers and is applicable to both planning and operations by park managers.	A Master Plan (or equivalent planning document) for any new and existing industrial park has been developed …, including the following core elements: - … procedure to safely locate high risk industries; … - …

In principle, park management entities could develop their own procedures. To do so, they could base themselves on guidance documents or regulations which are used in other countries for this purpose.

Nevertheless, to support park management entities in this task, but also to ensure that a harmonised approach is being used throughout the country, governments could publish a formal national guidance document on this topic.

Given the risks involved, this guidance would be a good candidate for being made legally binding by being published as a government regulation.

2) **Requirements nos. 17 and 34**: Tenant firms and (where they use hazardous materials or generate hazardous wastes) park management entities are expected to obey the principles of good practices for the appropriate management of these materials and wastes.

Description/Requirement	Prerequisites/Evidence – Performance Indicator
… Tenant firms are obliged to make as little use as possible of hazardous materials in their production process; to generate as little hazardous waste as possible, and to seek alter-native materials.	Obeying the principles of good practices for the management of hazardous materials and waste as part of legally binding agreements.
Program/mechanism in place with clear targets to reduce, and avoid the use of, dangerous and hazardous materials by firms in the park.	Proportion of firms in park, which appropriately handle, store, transport and dispose of toxic and hazardous materials.

In theory, parks could develop their own principles or adopt such principles which have been adopted in other countries or are being promoted by international organisations.

However, to support parks which are becoming EIPs in this task, but also to ensure that a harmonised approach is used throughout the country to hazardous materials and hazardous waste management, governments could publish a formal national guidance document on this topic.

Given the hazards involved, this guidance would be a good candidate for being made legally binding by being published as a government regulation.

3) **Requirements no. 21 and 38**: To properly implement the following requirements, tenant firms and park management entities will need to have access to laboratories which can do the necessary measurements of pollutants (see also section 6.5).

Description/Requirement	Prerequisites/Evidence – Performance Indicator
The park seeks to limit and mitigate pollution and GHG emissions, including air, waterway, and ground pollution. …	A program is established with clear evidence of steps taken to monitor, mitigate and/or minimise GHG emissions, such as carbon dioxide (CO_2), methane (CH_4), and nitrogen ox-ide (NO_x).
A mechanism is in place to avoid, minimise, and/or mitigate significant point-source pollution and GHG emissions. …	Proportion of firms in park which have pollution prevention and emission reduction strategies to reduce the intensity and mass flow of pollution/emission release which exceed national regulations.

In turn, the laboratories will need to use standard methods to take samples and test those samples. In principle, laboratories could choose to use methods which have been adopted in other countries.

However, governments could ensure harmonised approaches are used throughout the country by publishing a formal guidance document on the sampling and testing methods to be used.

Given the fact these measurements could determine whether or not firms are in compliance, this guidance would be a good candidate for being made legally binding by being published as a government regulation.

4) **Requirement no. 37**: Park management entities are expected to take steps to integrate native flora and fauna into the parks.

Description/Requirement	Performance Indicator
Native flora and fauna … are integrated within the industrial park and natural ecosystem where possible.	…

In principle, park management entities could decide for themselves what native flora and fauna to integrate within the industrial park.

However, governments could support park management entities in the implementation of this requirement by publishing formal guidance on what species of native flora and fauna it would prefer parks to help maintain. It should be remembered that flora and fauna often have a regional or even local range, especially those species which are fragile and threatened; it is these that governments are presumably most anxious to protect. Thus, any formal guidance will need to be very location specific, so that industrial parks can help to maintain the flora and fauna which are native to their particular localities.

5) Requirement no. 39

Description/Requirement	Performance Indicator
…	Proportion of firms in industrial park which have a risk management framework in place that: (a) identifies activities which have an impact on the environment; (b) assigns a level of significance to each activity and; (c) have appropriate mitigation measures in place.

In principle, tenant firms could decide for themselves what methodology to use to develop their risk management frameworks, possibly basing themselves on such methodologies developed elsewhere in the world.

However, governments could support the efforts by tenant firms here, and also ensure a country-wide harmonisation in approaches used, by publishing formal guidance on how firms should go about preparing risk management frameworks.

6.2 TRAINING AND KNOWLEDGE-DISSEMINATION FOR IMPLEMENTATION OF EIP REQUIREMENTS

There are a good number of cases where the government could greatly support tenant firms and the park management entities in the implementation of EIP requirements by offering them training and knowledge dissemination on a variety of different issues. In principle, tenant firms and park management entities could implement the requirements without any support. However, all these parties could have real difficulties understanding what the EIP requirements expect of them and what would be their best options for implementation. This would be especially the case for any tenant firms which were SMEs.

More specifically, the support offered could take the following forms:

- *Information dissemination;*
- *training programs;*
- *the services of external experts to support the tenant firms and park management entities in their efforts, and;*
- *audits, to help them understand what the status of their efforts are.*

Depending on the situation, the government could ensure that this support is free or at least partially subsidised.

The government itself could offer the training and knowledge dissemination. Alternatively, it could establish, or encourage the establishment of, industry support institutions which could offer the necessary specialised training and knowledge dissemination. An example of how this can be done is the UNIDO-UNEP National Cleaner Production Centre (NCPC) programme, where the two organisations, in partnership with national governments, established centres in many countries to offer industry the services described above focused, in this case, on the uptake of

Resource Efficiency and Cleaner Production (RECP) by enterprises.[10] It could also be a question of repurposing some existing industry support institutions, extending their skills set through training by external experts, so that they can offer a new set of services to industrial parks.

Note that there is an expectation in some of the requirements listed below (notably Requirements no. 10 and 29) that it is the park management entities which should be offering this kind of training and knowledge dissemination support to their tenant firms. If this were adopted as a more general strategy, government support could focus entirely on the park management entities, to put them in the position of being able to offer the necessary support to the tenant firms as they come into the park (in effect, a "training-of-trainers" arrangement).

Note also that in many cases the training and knowledge dissemination could lead the tenant firms and park management entities to choose to implement options which would require them to invest in infrastructure, technologies, or equipment. The issue of financial support from the government for such investments is taken up below, in section 6.3.

Similarly, the training and knowledge dissemination could lead tenant firms and park management entities to decide that Research and Development (R&D) is required to better understand what options are available to them and what could be the costs and benefits of such options. The issue of government support for R&D is taken up below, in section 6.4.

Note finally that some of the training and knowledge dissemination could lead to the park management entities and tenant firms requiring the support of external entities offering specialised services. The issue of government support to ensure that these specialised services exist is taken up below, in section 6.5.

The various issues covered by the EIP requirements where training and knowledge dissemination could be useful are listed below.

1) **Requirements nos. 10, 25, 29, and 42:**

Description/Requirement	Prerequisites/Evidence – Performance Indicator
The park has appropriate, functioning EMS and EnEMS systems (e.g., ISO 14001 and ISO 50001) in place to set and achieve targets, and covering key issues (e.g., energy, waste and material use; water; point-source emissions; and the natural environment)	Park management entity operates an environmental/energy management system in line with inter-nationally certified standards, monitoring park performance and supporting resident firms in the maintenance of their own firm-level management systems. …
Firms have functioning and fit-for-purpose EMS/ EnMS systems. …	Proportion of a firm's energy consumption that is covered by an energy management system.
…	The equivalent of at least 10% of the total CO_2 emissions (Scope 1 and 2) at park level is covered by the percentage of firms that have a qualified energy efficiency certification (LEED, Industry

[10] https://www.unido.org/our-focus/cross-cutting-services/partnerships-prosperity/networks-centres-forums-and-platforms/national-cleaner-production-centres-ncpcs-networks

	EDGE, DGNB or ISO 50001 or their national equivalent).
Firms in the industrial park should have an OH&S management system in place (based on ISO 18001 standard), keep records about rates of injury, occupational diseases, absenteeism, as well as total numbers of work-related injuries and fatalities.	Proportion of firms in the industrial park with more than 250 employees that have an OH&S management system in place.

Governments could institute programmes to support tenant firms and park management entities in putting in place these various certified management systems.

2) Requirements nos. 12 and 29:

Description/Requirement	Prerequisites/Evidence – Performance Indicator
Energy efficiency strategies are in place for the park management infrastructure and major energy-consuming resident firms.	Supporting programs (e.g., energy efficiency net-works) are in place to improve the energy efficiency of major energy-consuming businesses in the park.
Energy efficiency opportunities should be actively identified at the park and firm levels to reduce energy use and associated greenhouse gas emissions. EIPs should identify and promote technological and process-related interventions in their own and resident business operations.	…

Governments could institute programmes to support tenant firms and park management entities in putting in place their energy efficiency strategies.

3) Requirements nos. 15 and 32:

Description/Requirement	Prerequisites/Evidence – Performance Indicator
… The park and firms should have systems in place to increase water savings and reuse.	Park management entity has operational plans to increase water reuse in next five years. …
The park and firms have systems in place to increase water savings and reuse.	Proportion of total industrial wastewater from firms in the park that is reused responsibly within or outside the industrial park.

Governments could institute programmes to support tenant firms and park management entities in identifying their water savings and reuse options and implementing them (keeping in mind, however, the potential barrier to water reuse discussed in sections 4.1.1. and 5.2.1)

4) Requirement nos. 17 and 34:

Description/Requirement	Prerequisites/Evidence – Performance Indicator

… Tenant firms are obliged to make as little use as possible of hazardous materials in their production process; to generate as little hazardous waste as possible, and to seek alternative materials.	…
Program/mechanism in place with clear targets to reduce, and avoid the use of, dangerous and hazardous materials by firms in the park.	…

Governments could institute programmes to support tenant firms (and park management entities if they are using hazardous materials in, e.g., the centralised WWTP) in identifying and implementing their options to avoid the use of hazardous materials, and to reduce their consumption where they use them.

5) **Requirement no. 18:**

Description/Requirement	Prerequisites/Evidence
The park management and firms are obliged to con-sider circular economy principles and practices …	…

Governments could institute programmes to support tenant firms and park management entities (a) to understand how circular economy principles apply to a park, (b) to identify what circular economy practices best apply to them, and (c) to implement these practices.

Government support on the issue of circular economy would be especially welcome since the concept of circular economy is unknown to many enterprises.

6) **Requirements no. 21 and 38:**

Description/Requirement	Prerequisites/Evidence – Performance Indicator
The park seeks to limit and mitigate pollution and GHG emissions, including air, waterway, and ground pollution. …	A program is established with clear evidence of steps taken to monitor, mitigate and/or minimise GHG emissions, such as carbon dioxide (CO_2), me-thane (CH_4), and nitrogen ox-ide (NO_x).
A mechanism is in place to avoid, minimise, and/or mitigate significant point-source pollution and GHG emissions. …	Proportion of firms in park which have pollution pre-vention and emission reduction strategies to reduce the intensity and mass flow of pollution/emission release which exceed national regulations.

Governments could institute programmes to support tenant firms and the park management entities to identify the options available to them to mitigate, minimise, and reduce their emissions, discharges, and other releases to the environment.

7) **Requirement no. 28:**

Description/Requirement	Performance Indicator
The industrial park leverages available renewable generation sources …	Total renewable energy use for electricity and heat production in the industrial park is equal to or greater than the renewable energy share in the annual national electricity mix in the grid.

Governments could institute programmes to support tenant firms and the park management entities to identify and implement the optimal RE options (keeping in mind, however, the potential barrier discussed in section 4.2.2.).

8) **Requirement no. 39:**

Description/Requirement	Performance Indicator
…	Proportion of firms in industrial park which have a risk management framework in place that: (a) identifies activities which have an impact on the environment; (b) assigns a level of significance to each activity and; (c) have appropriate mitigation measures in place.

Governments could institute programmes to support tenant firms to work their way through the process of preparing their risk management frameworks.

6.3 Financial Support for Implementation of EIP Requirements

A number of the EIP requirements could well lead to park management entities or the tenant firms, or even the park investors, having to invest in infrastructure, technologies, or equipment. In principle, they could raise the necessary funds on the national or even international markets. However, especially where there are SMEs among the tenant firms, they could have difficulty doing so at an affordable cost.

Governments could offer support such investments in a number of ways:

- *They could make special credit lines available with below-market interest rates;*
- *They could offer loan guarantee programmes, which would lower risks for banks and lead to lower interest rates;*
- *In certain situations, they could turn investments at least partially into grants.*

Note that governments often have such programmes already in place. In this case, it would be more a question of amending the eligibility criteria of these programmes to ensure that park management entities or tenant firms (or even park investors) from parks aiming for EIP status are allowed access to them.

The various EIP requirements where access to subsidised capital could be helpful are listed below.

6.3.1 FINANCIAL SUPPORT FOR UTILITY SYNERGIES AND INFRASTRUCTURE SHARING

A good number of the EIP requirements where access to subsidised capital could help have to do with building or installing common utilities and infrastructure. As explained in the chapeau to section 4.1, this would be that form of industrial synergies called "utility synergies and infrastructure sharing". As such, given that implementing industrial synergies would form a large part of an industrial park's circular economy practices, ensuring these utility synergies and infrastructure sharing would support an industrial park's overall efforts to implement circular economy practices.

1) Requirements nos. 12 and 29:

Description/Requirement	Prerequisites/Evidence – Performance Indicator
Energy efficiency strategies are in place for the park management infrastructure and major energy-consuming resident firms.	…
Energy efficiency opportunities should be actively identified at the park and firm levels to reduce energy use and associated greenhouse gas emissions. EIPs should identify and promote technological and process-related interventions in their own and resident business operations.	…

Establishing energy efficiency programmes could lead to park management entities or tenant firms having to invest in, e.g., higher-efficiency infrastructure, technologies or equipment. Part of this infrastructure could well be used in common, e.g., centralised power plant.

2) Requirement no. 14:

Description/Requirement	Prerequisites/Evidence
A program/mechanism is in place to identify opportunities for common energy and heat exchange net-works to be established. The park management will provide the required physical network …	Park management provides the physical network for waste heat/energy exchange at park level, and assists firms to connect to the network. …

Promoting waste heat and energy exchanges in the park (e.g., exchanges of waste steam) will be one of the park's shared infrastructure. The EIP requirement expects this physical network to be present in a park, so the park management entity (or the park's investors) will need to invest in it.

3) Requirement no.16:

Description/Requirement	Prerequisites/Evidence
… The park and firms should have systems in place to increase water savings and reuse	Park management entity provides the physical net-work for water reuse/cascading of water

The requirement expects this shared infrastructure of a physical network for water reuse/cascading of water to be present in an EIP, so the park management entity (or the park's investors) will need to invest in it.

4) Requirements nos. 21 and 38:

Description/Requirement	Prerequisites/Evidence – Performance Indicator
The park seeks to limit and mitigate pollution and GHG emissions, including air, waterway, and ground pollution. The park seeks to limit and mitigate pollution and GHG emissions, including air, waterway, and ground pollution. …	A program is established with clear evidence of steps taken to monitor, mitigate and/or minimise GHG emissions, such as carbon dioxide (CO_2), methane (CH_4), and nitrogen oxide (NO_x).
A mechanism is in place to avoid, minimise, and/or mitigate significant point-source pollution and GHG emissions. …	Proportion of firms in park which have pollution prevention and emission reduction strategies to reduce the intensity and mass flow of pollution/emission release which exceed national regulations.

The introduction of many of such measures would require investments in new infrastructure, technologies and equipment. Some of the infrastructure could well be used in common, e.g., energy-generating utilities.

5) Requirement no. 28:

Description/Requirement	Performance Indicator
The industrial park leverages available renewable generation sources …	Total renewable energy use for electricity and heat production in the industrial park is equal to or greater than the renewable energy share in the annual national electricity mix in the grid.

The introduction of RE measures by both tenant firms and the park management entities would require, possibly substantial, investments in RE technologies. Some of these RE technologies could be used in common, yet another form of utility synergies and infrastructure sharing mentioned in section 4.1.

6.3.2 FINANCIAL SUPPORT FOR OTHER EQUIPMENT, TECHNOLOGIES, AND INFRASTRUCTURE

Other EIP requirements where access to subsidised capital could help have more to do with equipment, technologies, and infrastructure which are used by individual tenant firms, although where the park management entity is involved it could also have to do with the types of common utilities and infrastructure discussed in the previous section.

6) **Requirements nos. 10 and 25**:

Description/Requirement	Prerequisites/Evidence – Performance Indicator
The park has appropriate, functioning EMS and EnEMS systems (e.g., ISO 14001 and ISO 50001) in place to set and achieve targets, and covering key issues (e.g., energy, waste and material use; water; point-source emissions; and the natural environment)	…
Firms have functioning and fit-for-purpose EMS/ EnMS systems. …	…

Establishing EMSs and EnMSs could lead to park management entities or tenant firms having to invest in, e.g., higher-efficiency equipment technologies.

7) Requirement no. 17:

Description/Requirement	Prerequisites/Evidence
… Tenant firms are obliged to make as little use as possible of hazardous materials in their production process; to generate as little hazardous waste as possible, and to seek alter-native materials.	Obeying the principles of good practices for the management of hazardous materials and waste as part of legally binding agreements.

The need to reduce the use of hazardous materials and the generation of hazardous waste could require tenant firms to invest in new technologies and equipment.

8) Requirement no. 18:

Description/Requirement	Prerequisites/Evidence
The park management and firms are obliged to con-sider circular economy principles and practices (e.g. circular products, using as little virgin raw material as possible, reuse and re-manufacturing of components and parts and making extensive use of secondary/recycled materials generated in the park).	…

The identification by tenant firms and park management entities of their circular economy practices in some cases could require investments in new infrastructure, technologies and equipment.

6.4 SUPPORT FOR R&D

In a number of EIP requirements, it may not be clear to the park management entities or to the tenant firms what might be the best infrastructural or technological options for them to adopt.

In such cases, some Research and Development (R&D) will be required to clarify the options. In principle, the park management entities and tenant firms could undertake the R&D themselves or contract it out to a third party, e.g., a university. However, if a considerable amount of upstream, more fundamental research is required, private companies are often reluctant to undertake the R&D because the risks of failure are perceived as too high.

In this case, governments can step in and subsidise – or partly subsidise – the necessary research. In situations where research could be valuable to a number of different companies (e.g., those in the same sector, or companies potentially involved in an industrial symbiosis project), governments can also play the role of facilitator, bringing together the different parties and coordinating individual efforts. The precise form of government intervention can vary, but one possible way would be in the form of specific programmes promoting EIP practices (this is the case, for instance, in the GEIPP countries, where country-level interventions are being designed).

Note that governments often have such R&D programmes already in place. In this case, it would be more a question of amending the eligibility criteria of these programmes to ensure that park management entities or tenant firms from parks aiming for EIP status are allowed access to them. Difficulties of access to existing R&D programmes have been noted in **Peru**, for instance.

The various EIP requirements where R&D is most likely to be needed are listed below.

6.4.1 R&D SUPPORT FOR UTILITY SYNERGIES AND INFRASTRUCTURE SHARING

As in the case of financial support (see previous section), tenant firms and park management entities could require R&D support for exploring the park's best options for some of its common utilities and infrastructure. As explained in the chapeau to section 4.1, this would be that form of industrial synergies called "utility synergies and infrastructure sharing". As such, given that implementing industrial synergies would form a large part of an industrial park's circular economy practices, helping to find the right options for these types of utility synergies and infrastructure sharing would support an industrial park's overall efforts to implement circular economy practices.

1) **Requirement no. 13:**

Description/Requirement	Prerequisites/Evidence
A program/mechanism is in place to identify opportunities for common energy and heat exchange net-works to be established. The park management will provide the required physical network and offers support programs to assist resident firms with implementation.	An industrial heat recovery strategy is in place to investigate opportunities for heat and energy recovery for the major thermal energy-consuming firms in the park. …

Tenant firms and park management entities could be supported in researching their options for common heat and energy recovery technology and infrastructure as part of the park's industrial heat recovery strategy.

2) **Requirements nos. 21 and 38:**

Description/Requirement	Prerequisites/Evidence – Performance Indicator
The park seeks to limit and mitigate pollution and GHG emissions, including	A program is established with clear evidence of steps taken to monitor, mitigate and/or minimise

air, waterway, and ground pollution. The park seeks to limit and mitigate pollution and GHG emissions, including air, waterway, and ground pollution. …	GHG emissions, such as carbon dioxide (CO_2), methane (CH_4), and nitrogen oxide (NO_x).
A mechanism is in place to avoid, minimise, and/or mitigate significant point-source pollution and GHG emissions. …	Proportion of firms in park which have pollution prevention and emission reduction strategies to reduce the intensity and mass flow of pollution/emission release which exceed national regulations.

Not all such measures may be well defined, especially those to reduce GHG emissions. Tenant firms and park management entities could therefore be supported in researching their options for reducing their various releases to the environment, especially their GHG emissions; the most important of these could be coming from fossil-fuel powered common utilities.

3) Requirement no. 28:

Description/Requirement	Performance Indicator
The industrial park leverages available renewable generation sources …	Total renewable energy use for electricity and heat production in the industrial park is equal to or grea-ter than the renewable energy share in the annual national electricity mix in the grid.

Although many of the technological solutions for RE are well known, there could still be situations where potential RE solutions for a park are not well characterised and therefore where government support for researching these solutions would be helpful to the implementation of the EIP requirements. A number of these could involve RE technology that would be used in common by the park.

6.4.2 OTHER POSSIBLE R&D NEEDS

Other R&D needs could be more relevant to the operations of individual tenant firms.

1) Requirement no. 17:

Description/Requirement	Prerequisites/Evidence
… Tenant firms are obliged to make as little use as possible of hazardous materials in their production process; to generate as little hazardous waste as possible, and to seek alter-native materials.	Obeying the principles of good practices for the management of hazardous materials and waste as part of legally binding agreements.

Tenant firms (and possibly the park management entities) could be supported in researching what could be safer alternatives to the hazardous materials they are using.

2) **Requirement no. 18:**

Description/Requirement	Prerequisites/Evidence
The park management and firms are obliged to consider circular economy principles and practices (e.g. circular products, using as little virgin raw material as possible, reuse and re-manufacturing of components and parts and making extensive use of secondary/recycled materials generated in the park).	…

Since circular economy is still a very new concept for many enterprises, the options available to the tenant firms (as well as park management entities) could well be quite unclear. So support could be very necessary to research the best CE options and understand how best to insert them into existing productive processes.

6.5 SUPPORT FOR THE ESTABLISHMENT OF SPECIALISED SERVICE PROVIDERS

In order to implement some of the EIP requirements, park management entities and tenant firms would need the support of external specialised service providers. In turn, government support could be needed to ensure that these service providers exist in the national context.

The various types of service providers, and the type of government support needed, are described below.

1) **Requirements nos. 12, 25, 29, and 42**: In these EIP requirements, there is an expectation that park management entities and tenant firms will put in place a management system: Environmental Management Systems (EMSs) and Energy Management Systems (EnMSs) in Requirements nos. 10 and 25; energy efficiency programmes in Requirement no. 29; Occupational Health and Safety Management Systems (OHSMSs) in Requirement no. 42. In all probability, park management entities and tenant firms would want to obtain a formal certification for their systems. Certification would require using the services of an accredited certifying body. The services of foreign certifying bodies could be used, but they would be expensive.

Governments could support the establishment of local accredited certifying bodies by putting in place the necessary accreditation system, through the national standards body, and then encouraging (and supporting, if necessary) local entities to obtain the accreditation.

2) **Requirements nos. 21 and 38:** These requirements expect tenant firms and park management entities to be monitoring and measuring their emissions, discharges, and other releases. This presupposes that tenant firms and park management entities have access to a sufficient number of properly accredited laboratories to make the necessary measurements of pollutants.

Governments could ensure that the necessary accreditation procedures are in place for laboratories and that a sufficient number of them have been duly accredited (see also section 6.1).

7 INTEGRATING EIP REQUIREMENTS INTO LAW TO SUPPORT IMPLEMENTATION BY PARK MANAGEMENT ENTITIES

Many countries have national laws governing the establishment of industrial parks, or certain types of industrial parks. This is true, for instance, for all the countries in the GEIPP. In these cases, it would be easier for park management entities to implement many of the EIP requirements that are specifically aimed at them, if these requirements were reflected in the law, i.e., if they were elevated to the level of a legal requirement.

The EIP requirements where this could be most helpful are listed below, clustered by three of the four original groupings used in the International EIP framework, viz. park management, environmental performance, and economic performance (no requirements of this nature fall in the grouping of social performance). Unsurprisingly, a large portion of these requirements fall in the park management grouping. Another large portion fall in the economic performance grouping.

In most cases, the text of the relevant requirements are cited to show more clearly the connection to policies. Note that, for the sake of clarity, since many of the requirements cover multiple topics, the texts of the requirements have been edited to give only the most relevant portion of the requirements, with deleted text shown as ellipses […]). The full texts can be seen in Annexes B and C.

7.1 PARK MANAGEMENT

No.	Description/Requirement	Prerequisites/Evidence – Performance Indicator
1	A park management entity (or alternative agency, where applicable) exists to handle park planning, operations and management, and monitoring.	A distinct park management entity (or alternative agency, where applicable) exists to handle park planning, operations and management, and monitoring.
2	The park management entity provides and facilitates common services and infrastructure to resident firms to ensure smooth operations.	Park management entity to manage and maintain the industrial park property, common infrastructure, and services as prescribed in … the park's Master Plan. This should include, but is not limited to the following: - Property management, including plot allotments, re-allotments, development, land-use monitoring.

		- Utilities, roads, security (including IT security) and emergency response services/facilities and wastewater treatment plants and operations, including waste heat/energy recovery and distribution networks. - Environmental monitoring and advisory activities. - Common landscaping, buffer zones, street lighting, security surveillance and street cleaning. - Provide facilitating services to and between tenant firms (for example, networking, collaboration and training opportunities). - Engagement with the park's stakeholders and business representatives. - PR and community participation centre / platform / activities
3	The park management entity has established and maintains a system for monitoring achievement of threshold EIP performance targets and management of critical risk factors within the park.	Park management entity maintains an EIP framework monitoring system in place, tracking: - Progress on environmental, social and economic performance at the park level annually. - Critical risk factors and related responses, at least for: ▪ Risk points where 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); ▪ Environmental performance; ▪ Social performance; ▪ Economic performance; and ▪ Critical risk management at the level of the park. - ….
4	The park management establishes measures to deal with climate change adaptation and disaster preparedness.	Park management has a plan in place, to be updated every seven years, to react to possible negative impacts due to climate change risks (heat waves and droughts, storms and floodwater events). All adaptation needs for infrastructure and services are identified and in place for the industrial park to protect against climate change risks and potential damages. Park management entity and resident firms have plans and measures to ensure continued operation of critical infrastructure systems within the park (e.g., wastewater treatment plants, power plants, recycling facilities, etc.) that can be activeted even in emergencies.

5	The park management entity collects, assesses, and reviews comprehensive climate risk information specific to the location of the park.	Park management entity investigates risks due to climate change and updates this information on a regular basis.
7	A master plan for the EIP is developed by park developers and is applicable to both planning and operations by park managers.	A Master Plan (or equivalent planning document) for any new and existing industrial park has been developed and is reviewed periodically (minimum every seven years) and updated if required, including the following core elements: - Based on various risk analyses; essential and efficient infrastructure (onsite and offsite, in particular ensuring access to decent housing), utilities, transportation network; environmental and social issues; buffer zone around the park; procedure to safely locate high risk industries; and cluster synergistic industries and similar - …

7.2 ENVIRONMENTAL PERFORMANCE

No.	Description/Requirement	Prerequisites/Evidence – Performance Indicator
10	…	Park management entity operates an environmental/ energy management system in line with inter-nationally certified standards, monitoring park performance …

7.3 ECONOMIC PERFORMANCE

No.	Description/Requirement	Prerequisites/Evidence – Performance Indicator
54	…	Park management entity allows and promotes the establishment of SMEs that provide services and add value to park residents
55	An EIP must generate employment opportunities in the areas in which it operates to ensure revenue linkages and development opportunities.	Park management entity has plans to maximise local benefits.
56	The development of an EIP … must be based on realistic market and industry demands to ensure economic feasibility	A market demand and feasibility study, supported by a business plan~~,~~ for specific "green" infrastructure and services has been undertaken to justify planning and implementation in the industrial park.
57		Park management is financially solvent to operate/provide park infrastructure and services

58		The park management should be economically viable in terms of contributing to jobs, technology, and acting as a catalyst to development of local industry.
59		Park management entity is responsible for marketing the park and park concepts (EIP concept) to potential national and international investors.
60	A dedicated financial model capturing EIP salient features must be used to set pricing levels and anticipated revenues in order to enhance financial viability of EIP investments.	The park management should render its services at realistic costs to cover operational expenditures.

8 MONITORING AND ENFORCING COMPLIANCE IN AN EIP

This chapter discusses the specific issue of monitoring and enforcing compliance in an EIP, because there are several EIP requirements where the expectation is that the park management entity will have the authority to undertake monitoring of a regulatory nature as well as to enforce laws and regulations:

No.	Description/Requirement	Prerequisites/Evidence
3	The park management entity has established and maintains a system for monitoring achievement of threshold EIP performance targets and management of critical risk factors within the park.	Park management entity: … - … - Acts as monitoring and pre-clearing institution for environmental issues on behalf of the regulatory bodies, as delegated. - …
6	Park management has a good understanding of regulations and international standards applicable to industrial park compliance and enforces them in the park.	… Park management enforces compliance by resident firms and requests and collects compliance information that firms share with the park management entity.
20	Waste/secondary raw materials (including hazardous waste) leaving the park is being monitored to check that the material is either re-used or further processed by authorised firms outside of the park, or disposed of according to legal and environmental standards.	A monitoring system is in place that controls and registers origin, type, mode and route of transport, and final destination of waste/secondary raw material leaving the park

However, there are some important legal issues linked to the idea that park management entities should be given the responsibility to monitor and enforce compliance with laws and regulations.

In the first place, the relevant laws and regulations formally attribute responsibility for monitoring and enforcement to a government authority. Therefore, in the absence of a formal and explicit delegation from that same authority (which is what EIP Requirement no. 6 implies with the phrase "as delegated"), it would be difficult if not impossible for a park management entity to take on these compliance monitoring and enforcement responsibilities.

This suggests that as part of the planning process for a new park, the idea of delegating compliance monitoring and enforcement to the park management entity should be discussed. If the relevant competent authorities are agreeable (and if this delegation is legally possible), it should be formalised in some way. If the competent authorities are unwilling (or unable) to delegate this authority, some other role for the park management entity in supporting compliance monitoring and enforcement can be explored – for instance, the park management entity could

collect certain data from the tenant firms and forward these periodically to the authority/ies responsible for compliance. This role can then be made clear in the legally binding lease agreement or other instrument signed between the park management entity and the tenant firms (see, however, Section 5.3.3 below for more on the issue of legally-binding instruments between park management entities and tenant firms).

It needs to be stressed that this recommendation is predicated on the assumption that the competent authorities actually have the right to delegate their legal responsibilities to park management entities in this way, something which is not immediately apparent. The legality of such a delegation would need to be studied thoroughly before any final decisions were made.

This idea of delegating responsibility for monitoring and enforcing compliance to park management entities does throw up a couple of other issues which would need clarification – assuming that such a delegation can occur in the first place:

1) Requirements 3 and 6 in the table above cover delegating to the park management entity the responsibility to monitor and enforce tenant firms' compliance. A delegation of this nature, kept within the boundaries of the park, seems reasonable. However, requirement 20 goes much further, with an expectation that park management entities should monitor and enforce compliance outside the park. What is being described in this requirement is essentially what is often called in waste legislation a waste manifest system: a system for checking if wastes have indeed reached the ultimate treatment or disposal facility which generators state the wastes were meant to go to. Any meaningful monitoring on the part of the park management entity would entail it having to check with treatment and disposal facilities outside the park if they had indeed receive the wastes they were meant to have received and treated or disposed of them correctly. Is it realistic to think that such a broad delegation could be given?

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2) In this system of delegation, there is also an issue of how the park management entity could monitor and enforce its own compliance. The implication of the three EIP requirements in the table above is that it is only the tenant firms (and firms outside the park) which are subject to legal and regulatory requirements and which therefore need to be monitored. But in a number of cases, it would be the park management entity itself which is subject to legal and regulatory requirements: if the park has a centralised wastewater treatment plant (WWTP), it is the park management entity which will be legally responsible for the quality of the treated effluent leaving the plant; if the park has a centralised utility, the park management entity will be responsible for the quality of the air emissions from that utility; if the park has a centralised waste processing/treatment facility, the park management entity will be responsible for ensuring that the facility respects all the relevant legal and regulatory requirements; and so on. A delegation system, if it meant that the enforcement authorities took a "hands off" approach to an industrial park, would therefore leave important gaps in the enforcement system.

With respect to the last point, and considering specifically environmental compliance, one possible approach would be for the authorities to consider treating an industrial park as one entity. In many parks, this is already done with respect to wastewater discharges, where the "compliance point" is the final discharge of wastewaters from the park and where the park management entity is responsible to the competent authority for meeting the discharge standards. The park management entity is then free to have contracts with the tenant firms emitting into the park's centralised WWTP, in which it sets specific quality standards that the wastewaters of these firms must meet in order to ensure that it can in turn meet the legally mandated "end-of-pipe" standards. This is the case, for instance, in **Indonesia**. With EIAs, a similar approach is used, as has been described in section 4.2.1, where the park management

entity is responsible for the park's overall EIA, with new tenant firms being slotted into this overall EIA as they locate in the park.

This thinking could be extended to air emissions. In some countries, a "bubble" approach has been used with CO_2 emissions, for instance, where a cluster of emitters agree to meet an overall level of emissions and then divide up among themselves that overall number. Given the general compactness of industrial parks, most if not all of the air emissions from a park could be dealt with in this way, with one air emission permit for the park setting one overall level of emissions, which the park management entity and the tenant firms divide amongst themselves. The park management entity would have the authority to monitor that individual tenant firms are meeting their mutually agreed limits.

In the case of wastes, this kind of bubble approach would be a way of dealing with the authorisation regime acting as a barrier to industrial symbiosis projects within the park. The park would effectively be considered one waste generator, and the reuse of waste between tenant firms would be considered a form of internal recycling, so requiring no authorisations to take place (and the transport of the wastes from one tenant firm to the other also requiring no authorisation). Only those waste streams leaving the park would be subject to the authorisation requirements. The same philosophy would apply to a wastewater streams being reused within the park.

In this case, the park management entity would be responsible to the competent authorities for compliance with the overall emission or discharge levels from the park, and would then have the power to ensure that the tenant firms meet the individual emission or discharge levels agreed between them and the park management entity.

While this kind of bubble approach might work in the case of environmental compliance, it is not clear that it could work in the case of compliance with occupational health and safety standards or with other social standards which individual firms are required to meet. This type of compliance would require a much more intrusive form of monitoring on the part of park management entities in the operations of the tenant firms.

It is also not clear if it would work in cases where the park management entities are themselves government entities. In some legal systems there is a question as to how enforcement can actually take place in such cases, since in a situation of non-compliance it would be the government taking itself to court. This issue has been brought up, for instance, in the case of **South Africa**. This strongly suggests that, in countries where there are legal hurdles to the government taking itself to court, park management entities should not be government entities so as to ensure that proper monitoring and enforcement of compliance can take place.

9 CONCLUSIONS AND RECOMMENDATIONS

Overall, the analysis laid out in the previous chapters shows that the role of government policies in the implementation of the EIP requirements can be characterised as quite important.

9.1 CONCLUSIONS

- For no more than a third of the 64 EIP requirements, there could be situations where the presence of policies on the books, or the lack thereof, could be a barrier – in some cases a significant barrier – to tenant firms and/or park management entities implementing the requirements unless they are amended (in the case of existing policies) or promulgated (in cases where policies are lacking).

- For another third of the requirements, possibly somewhat more, the presence of certain types of policies on the books could support – in some cases greatly support – tenant firms and park management entities in their efforts to implement the requirements, although they could in principle implement the requirements even in the absence of such supportive policies.

- Finally, for about one-third of the requirements government policies will not affect – positively or negatively – their implementation at all.

If governments decide that it is important to get as many as possible of the country's industrial parks to reach EIP status, then it is clear that they must work, first, to remove the policy barriers and, second, to implement policies which will support the parks' implementation of the EIP requirements.

9.1.1 POLICY BARRIERS NEEDING REMOVAL

The analysis shows by far the greatest number of policy barriers affect the EIP requirements falling in the Environmental Performance grouping, with a not insubstantial number also affecting EIP requirements falling in the Park Management grouping. While the type of policies causing the potential barriers are varied, there are some general trends:

- In the case of barriers being created by existing policies, a country's waste management laws and regulations could be the source of a considerable number of such barriers. The EIP requirements that would be particularly affected are those promoting industrial symbiosis (the reuse by one firm of another firm's waste as a raw material), which would be an important way in which tenant firms and park management entities meet the EIP requirements for the uptake of circular economy practices. The source of the barriers is the manner in which these laws and regulations define waste coupled with the heavy authorisation regime for the management of anything which the laws/regulations define as waste. A country's laws and regulations governing the management of wastewaters

could add a further barrier to industrial symbiosis where wastewater would be the material being reused.

- Other existing policies which could be creating barriers are those governing the installation of RE systems, those governing the preparation of EIAs, and those regulating the fiscal exemption regime of FTZs or equivalent parks.

- In the case of barriers being created by the lack of policies, several clusters exist. Perhaps the most critical is a number of potential policy gaps linked to the initial establishment of parks: a lack of investment by governments in the necessary infrastructure (electricity lines, water lines, roads) to ensure that they are brought to the park fence ready for hook-up; a lack of investment by governments in decent housing in the surrounding communities for the parks' workers; the allocation of too little land to the parks for them to be able to satisfy all the EIP's spatial requirements.

- Another cluster brings together policies covering quite different topics but which all have one thing in common: the potential absence of technical regulations, which means that the laws cannot be properly implemented. Absence of such regulations could lead to barriers to the reuse of industrial wastewater; to parks extracting and consuming water at sustainable levels; to tenant firms being able to have the wastes they cannot reuse properly treated and disposed of.

- Other situations where the lack of policies could create a barrier are: in the implementation of certain types of circular economy practices; and in the ability of park management entities to provide their services in a financially sustainable manner.

9.1.2 POLICIES TO SUPPORT IMPLEMENTATION OF EIP REQUIREMENTS

As for policies which could support the implementation of EIP requirements, they can take many forms. However, they do fall into several groupings.

- Governments could publish official guidance documents to help parks implement certain of the EIP requirements in a harmonised way (these guidance documents would not just be useful to tenant firms; any enterprise in the country would benefit from them). The subjects of these guidance documents would be:
  - the localisation of high-risk industries within parks;
  - the good practices to adopt for the appropriate management of hazardous materials and wastes;
  - the standard sampling and measurement methods to be used by laboratories in measuring pollutant levels;
  - the native species of flora and fauna which parks should strive to maintain.

- Governments could offer training and knowledge dissemination to help parks implement a series of EIP requirements – or they could ensure that this training and knowledge dissemination is offered by industry support institutions. This support could take the form of preparing guidance documents, delivering training, making the services of external experts available, or undertaking audits. The topics on which this training and knowledge dissemination could focus can be broken down into two broad categories:
  - Those having to do with management systems, strategies or other procedures which park management entities and/or tenant firms need to put in place, and

more specifically: various management systems (EMS, EnMS, OHSMS); identification of the circular economy practices which best apply to a park; energy efficiency strategies; risk management frameworks.

- Those having to do with identifying technical solutions which park management entities and/or tenant firms can implement to reduce various environmental impacts, and more specifically: water savings and reuse; avoidance/reduction in the consumption of hazardous materials; mitigation, minimisation, reduction of emissions, discharges, and other releases of pollutants and GHG emissions; uptake of renewable energy.

» One possible outcome of the training and knowledge dissemination efforts could be that park management entities or tenant firms (or even parks' investors) will need to invest in infrastructure, technologies, or equipment. Much of this would be common utilities or infrastructure, the implementation of which would be another important way for tenant firms and park management entities to meet the EIP requirements for the uptake of circular economy practices. Governments could support these investments through various programmes (low-interest loans, credit guarantees, grants, etc.) which reduce the cost of borrowing. The EIP requirements where investment in infrastructure, technology, or equipment might well be needed are: the establishment of management systems and energy efficiency programmes; the adoption of waste heat and energy exchanges or water reuse/cascading of water between tenant firms; reductions in the use of hazardous materials and the generation of hazardous waste; the adoption of certain circular economy practices; the adoption of measures to mitigate, minimise, reduce emissions, discharges, and other releases of pollutants and GHG emissions; the adoption of RE measures.

» Another possible outcome of the training and knowledge dissemination efforts could be that park management entities or tenant firms identify options that are either not well known or not well characterised in the context of an industrial park. In these cases, governments could support R&D programmes (in the form of specific programmes promoting EIP practices or otherwise) to help park management entities and tenant firms better understand and characterise their options. The EIP requirements where tenant firms and/or park management entities could well require access to government-supported R&D programmes are: the adoption of waste heat and energy exchanges; the search for alternatives to the use of hazardous materials; the adoption of novel circular economy practices; the adoption of options to eliminate or reduce releases of pollutants and GHG emissions, especially GHG emissions; the adoption of RE technologies.

» There are a number of EIP requirements where satisfying them will require tenant firms and park management entities to draw on the services of external specialised service providers. In particular, they will need to have access to accredited certification bodies to have their management systems certified, and they will need to have access to accredited laboratories to measure their emissions, discharges, and other releases of pollutants. Governments can ensure that these duly accredited service providers are available to parks by putting in place the necessary accreditation mechanisms and by working to ensure that a sufficient number of them are available for the parks to use (their services will also be useful to other enterprises not located in parks).

» Finally, in the specific case of countries which have laws on the books governing the creation of industrial parks, or at least certain types of industrial parks, governments

wanting to see the transition of these parks to EIP status could support that process by amending the laws to insert into them many of the EIP requirements aimed at park management entities, thus raising these requirements to the status of a legal requirement. Doing so would help park management entities in implementing their EIP-related responsibilities. The great majority of these requirements fall into the groupings of EIP requirements on Park Management and Economic Performance.

9.1.3 The issue of monitoring end enforcing compliance in an EIP

Some EIP requirements expect park management entities to be given the responsibility of monitoring and enforcing compliance inside the park and outside it. This expectation does throw up a series of issues: the need for the competent authorities to give out this delegation – assuming they are even legally allowed to give it out; the scope of this delegation – can it extend outside the park?; the gap in enforcement coverage if this delegation is given and if the park management entity does itself needs to comply with regulations; problems in enforcement if the park management entity is a government body – can government take itself to court for non-compliance?

9.2 RECOMMENDATIONS

9.2.1 Summary of previous specific recommendations

Already in the previous chapters, recommendations have been made on how to remove (or minimise) barriers described above in section 8.1, as well as what specific policies could be adopted to support the implementation of certain EIP requirements. These are summarised in the two tables below.

Table 3: Summary of recommendations to remove potential policy barriers to implementation of EIP requirements

Removing potential barriers in existing policies	
1	Where a law has a blanket prohibition on the reuse of industrial wastewater, governments should amend the original law to say that the reuse of industrial wastewater is prohibited unless and until it meets certain quality criteria, to be published later as a government regulation (but see also no.9 below).
2	Where the waste management law requires companies reusing wastes to obtain an authorisation to do so, governments should amend the law to exempt the reuse of waste from the authorisation requirements ("reuse" meaning cases where wastes can be turned into raw materials with little if any processing).
3	Where the waste management laws prohibit the reuse and recycling of toxic and hazardous wastes: Either governments should amend the law to allow toxic and hazardous wastes to be managed in the same ways as non-toxic/non-hazardous wastes are, i.e., allow them to be reused and recycled, as well as treated and disposed. Or governments should amend the methodology used to define which wastes are hazardous/toxic so as to allow generators of such wastes which have a good potential for reuse/recycling to request approval from the government to manage these wastes as if they were non-hazardous/non-toxic.
4	In cases of FTZs or equivalent becoming EIPs, governments should amend the rules establishing them to create a process whereby a waste generator in the FTZ can request special permission to send the waste to a reuser outside the FTZ, with the proviso that the

	generator needs to pay customs duties on that transfer as if the waste were a raw material being imported from abroad.
5	As a support to tenant firms which are remanufacturers: » where waste management laws define "cores" for remanufacturing as waste governments should amend the laws to specifically exempt cores from the definition of "waste" or to subsume them into the amendments recommended in no. 2 above. » where the tenant firm-remanufacturers are importing "cores" from abroad and where these cores are subject to import tariffs or import restrictions, governments should amend the customs regulations to remove these restrictions.
6	If a park is to have a central park facility or other mechanism in place to treat waste that cannot be processed by individual tenant firms, and if the country's waste management laws require such a facility to be authorised, the park management entity should enter into an agreement with a waste management company which is familiar with the authorisation system and have that company be responsible for the EIP's central facility.
Ensuring lack of policies does not become a barrier	
7	The planning process for new parks should ensure that the following government authorities are involved: » those responsible for bringing the necessary infrastructure (electricity lines, water lines, roads) to the park's boundary fence, so that they know the long-term infrastructure needs of the park and can make the necessary budgetary commitments to ensure that the park's infrastructure requirements will be satisfied. » those responsible for making available in the local communities the housing required by the park's workforce, so that they know the long-term housing needs of the park and can make the necessary budgetary commitments to ensure that the park's housing requirements for its workers will be satisfied. » those responsible for allocating land to the new park, so that they understand the park's total needs for land, including for common infrastructure, buffer zones, and biodiversity protection, as well as for future expansion, so that they can allocate sufficient land for the park. » those responsible for emitting the water extraction concessions/rights to the park, so that an analysis can be undertaken in the planning stage to determine what would be a sustainable level of water extraction for the park, given water availability in the region and the region's competing demands for water, on which to base the concessions/rights that will be released to the new park.
8	Where the reuse of industrial wastewater is prohibited unless and until regulations are passed setting the quality criteria these wastewaters must meet before they can be reused, and where those regulations still have not been published, the park's stakeholders should put pressure on the government to speed up the preparation of the regulations (see also no. 1 above).
9	In order for parks to meet the requirement that they have in place a waste management system which correctly manages unusable waste materials, (a) in the short term, park management entities should only accept new tenant firms if they can show that there is adequate authorised treatment and disposal capacity in the immediate region to take the unusable wastes which they will be generating, and (b) in the longer term, the park's stakeholders should engage with the waste management industry sector to find a more permament solution (which might require jointly approaching the relevant authorities to

	persuade them to speed up the process of emitting the necessary waste treatment and waste disposal authorisations).
10	Where, during circular economy assessments in parks, a shift from virgin raw materials to recycled raw materials is identified as a possible option, but where existing subsidies on the virgin raw materials are found to be an important barrier to the shift, the park's stakeholders should enter into a dialogue with the government to work on removing the subsidies. Parks should ally themselves with the recycling sector since it is also in the interest of recyclers that such subsidies be removed.
11	Where the residency contract/park charter/code of conduct which park management entities sign with tenant firms does not give them the necessary legal powers to charge fees for the services they provide, the park's stakeholders should enter into a dialogue with the relevant authorities to amend the necessary law(s) to give them these powers.

Table 4: Summary of recommendations to offer policy support to EIP requirements' implementation

Publication of official guidance documents	
1	To support park management entities and/or tenant firms implement a number of EIP requirements, governments could publish formal guidance documents. At a minimum, the topics covered by these guidance documents could be: » guidance for park management entities on how to safely locate high risk industries in their parks; » guidance for tenant firms and park management entities on the procedures to use to properly manage hazardous materials and hazardous wastes; » guidance for laboratories on the standard sampling and measuring methods they should use when measuring pollutant releases; » guidance for park management entities on the native species of flora and fauna which the government would wish the parks to help maintain.
Offering training and knowledge dissemination	
2	To support park management entities and tenant firms in their efforts to implement a series of EIP requirements, governments could offer the following: » dissemination of information; » training programs; » the services of external experts to support them in their efforts, and; » audits, to help them understand what the status of their efforts are. At a minimum, the topics covered in this training and knowledge dissemination could be: » establishment of management systems and energy efficiency strategies; » water savings and reuse; » elimination/reduction in the consumption of hazardous materials; » adoption of circular economy practices; » mitigation and minimisation of emissions, discharges and other releases to the environment; » adoption of RE measures; » preparation of risk management frameworks.
Offering financial support	

3	To support park management entities and tenant firms (as well as park investors) to implement a number of EIP requirements where investment in infrastructure, technology, or equipment is required, governments could offer at least the following: » They could make special credit lines available with below-market interest rates; » They could offer loan guarantee programmes, which would lower risks for banks and lead to lower interest rates; » In certain situations, they could turn investments into grants. At a minimum, the topics where investments could be required and therefore such support could be useful are: » establishment of management systems and energy efficiency strategies; » waste energy and heat exchanges; » the physical network for water exchanges/cascading; » elimination/reduction in the consumption of hazardous materials; » adoption of circular economy practices; » mitigation and minimisation of emissions, discharges and other releases to the environment; » adoption of RE measures.
Supporting R&D efforts	
4	To support tenant firms and park management entities to implement a number of EIP requirements where the technological options are not well characterised, governments can step in and establish programmes to subsidise – or partly subsidise – the necessary R&D to better characterise them. At a minimum, the topics where support on R&D could be useful are: » heat and energy recovery technology and infrastructure; » safer alternatives to the hazardous materials being used; » the optimal CE options to adopt and the best way to insert them into productive processes; » options for reducing various releases to the environment, especially GHG emissions; » optimal RE solutions.
Supporting establishment of specialised service providers	
5	To support tenant firms and park management entities to implement several of the EIP requirements, governments can put in place the necessary mechanisms to ensure that that the duly specialised service providers which the parks require are duly accredited. At a minimum, this would mean having in place accreditation mechanisms for: » entities offering to certify management systems » laboratories offering to measure emissions, discharges and other releases to the environment
Supporting park management entities through integration of EIP requirements into law	
6	In the case where a country has a law governing the establishment of IPs, or some types of IPs, governments could support park management entities by integrating a number of the EIP requirements specifically aimed at park management entities into this law. The great majority of these requirements have to do with the initial planning of the parks.

Table 5: Summary of recommendations regarding monitoring and enforcing compliance in EIPs

Monitoring and enforcing compliance in an EIP	
1	During the planning process for a new park, the idea of delegating compliance monitoring and enforcement to the park management entity should be worked through. If the relevant authorities are agreeable (and if this delegation is legally possible), they should formalise the delegation. If the relevant authorities are unwilling (or unable) to delegate this authority, a possible role for the park management entity in supporting compliance monitoring and enforcement can be explored – for instance, it could collect certain data from the tenant firms and forward these periodically to the authority/ies responsible for compliance. This role can then be made clear in the legally binding document signed between the park management entity and new tenant firms.
2	The other issues raised about monitoring and enforcing compliance in an EIP should also be worked through at this time. The possibility of extending the delegation beyond the boundaries of the park should be decided. If the delegation is given, the question of how to monitor and enforce the park management entity's own compliance needs to be resolved. The issue of using some sort of bubble approach to compliance should be studied. The question of whether or not the fact that park management entities are government bodies would act as a block on enforcement ("government cannot sue itself") should be resolved.

9.2.2 Using a broad process to implement the specific recommendations

» The individual recommendations given in Tables 3, 4 and 5 cannot be effectively implemented in an ad hoc, piecemeal fashion. They need to be implemented within a broad process in which all of the stakeholders in EIPs are involved.

» Upgrading industrial parks to EIP status will only be successful if all of the major stakeholders in EIPs are actively involved in the process of transitioning IPs to EIPs, and governments are going to be one of the key stakeholders in this process. This has been made abundantly clear by the projects being undertaken in the countries involved in the GEIPP. All these countries have established some type of mechanism through which the government and other stakeholders in EIPs together can guide the process of upgrading IPs to EIPs.

» One of the tasks of the stakeholders will be to analyse the existing policy landscape and decide how the policies can be amended, either to eliminate barriers to implementation of the EIP requirements or to be more supportive of that implementation. As part of this analysis, the potential barriers which have been identified in the previous chapters and are summarised in Table 3 should be reviewed, to assess if they hold in the particular policy context of the country, and if they do what steps need to be taken to eliminate/minimise them. The stakeholders should also assess what policies could be created (or strengthened, if they already exist), to properly support the efforts made by parks to upgrade to EIP status, looking at the various areas of intervention which have been outlined in the previous chapters and summarised in Table 4.

9.2.3 Extending existing support programmes

With respect specifically to government policies to support EIP implementation, it will often not be a case of governments having to create new policies *de novo*. In many cases, governments will already have created support programmes and it would be more a case of extending the eligibility criteria of those programmes or their scope to cover the issue of industrial parks attempting to transition to EIP status. For instance, governments will often have programmes which are supporting enterprises through industry support institutions. In this case, it could make more

sense to extend the scope of the more relevant industry support institutions to cover the topics which are of interest in the EIP transition. Governments will also often have schemes to support investments by enterprises. Here, it could make more sense to extend the eligibility criteria of the existing schemes so that tenant firms and park management entities in parks going for EIP status (as well as investors in those parks) can access the schemes. Similarly, governments might already have programmes through which they support R&D by the private sector. Here, too, it could make more sense to extend the eligibility criteria of the existing programmes so that tenant firms and park management entities in parks going for EIP status can access the programmes.

9.2.4 Park management entities as providers of supportive services

- In a good number of the EIP requirements, there is a clear expectation that the park management entities should be offering the tenant firms the necessary support to implement the requirements. But the park management entities will not be able to offer these services if they do not have staff on board with the necessary skills and training.

- Therefore, during their analysis of what supportive policies need to be created or strengthened, the stakeholders should also consider the issue of which of the support services it would be realistic to have the park management entity offer. This should then lead to decisions about the post(s) which should be created within the park management entity and about the necessary training programme(s) which the person(s) in those post(s) receive to then be able to offer the services to tenant firms ("training of trainers" programmes).

- Note that this issue is very much linked to the park management entity's ability to charge tenant firms for the services which if offers (see section 5.5.3.).

ANNEX A: RESEARCH METHODOLOGY DETAILS

This report was written by Edward Clarence-Smith, Green Industry and Circular Economy consultant.

To prepare the report, Mr. Clarence-Smith held many in-depth discussions with Klaus Tyrkko, Chief Technical Advisor for the Global Eco-Industrial Parks Programme (GEIPP) covering a number of topics: the focus to give to the research, the methodology to use for the research, the documents to review, and the GEIPP field staff to interview.

The documents which Mr. Clarence-Smith reviewed and the field staff whom he interviewed are listed in the two tables below.

DOCUMENTS COVERED IN THE INITIAL REVIEW

Colombia	Policy and Regulatory Analysis, 2020
	Stakeholder Mapping and Gap Analysis Report, 2020
Indonesia	Stakeholder Mapping and Assessment, April 2021
	Policy Excel tool completed
Peru	Policy Analysis Report (Revision 2), 2021
South Africa	Policy Analysis and Advisory Report for EIP Implementation in South Africa, July 2021
	Stakeholder Mapping Report for EIP Implementation in South Africa, May 2021
Ukraine	Policy Analysis Report, January 2021
	Stakeholders Assessment Report, March 2021
Viet Nam	Stakeholder Analysis and Development Roadmap, 2019
	Policy Review and Gap Analysis of Relevant Programmes related to Eco-Industrial Parks in Viet Nam, March 2021

FIELD STAFF INTERVIEWED

Colombia	Ms. Lizeth Olaya Zambrano National Coordinator, GEIPP Colombia
Indonesia	Mr. Salil Dutt Chief Technical Advisor, GEIPP Indonesia
South Africa	Mr. JC Greyling Senior Consultant, AIH Econogistics Author, GEIPP report on Policy Analysis
Viet Nam	Ms. Lien Co-author, GEIPP report on Policy Analysis (Alessandro Flammini, Project Coordinator, UNIDO HQ, also took part)

ANNEX B: FULL SET OF INTERNATIONAL EIP REQUIREMENTS

PARK MANAGEMENT

PREREQUISITES					
No.	Topic	Sub-topic	Description/Requirement	Prerequisites/Evidence	Available?
1	Park management services	Park management entity	A park management entity (or alternative agency, where applicable) exists to handle park planning, operations and management, and monitoring.	A distinct park management entity (or alternative agency, where applicable) exists to handle park planning, operations and management, and monitoring.	[Yes/No]
2		Park property, common infra-structure and services	The park management entity provides and facilitates common services and infrastructure to resident firms to ensure smooth operations.	Park management entity to manage and maintain the industrial park property, common infrastructure, and services as prescribed in the tenant contract and the park's Master Plan. This should include, but is not limited to the following: - Property management, including plot allotments, re-allotments, development, land-use monitoring. - Utilities, roads, security (including IT security) and emergency response services/facilities and wastewater treatment plants and operations, including waste heat/energy recovery and distribution networks.	[Yes/No]

				- Environmental monitoring and advisory activities. - Common landscaping, buffer zones, street lighting, security surveillance and street cleaning. - Provide facilitating services to and between tenant firms (for example, networking, collaboration and training opportunities). - Engagement with the park's stakeholders and business representatives. - PR and community participation centre / platform / activities	
3	Monitoring and risk management	Monitoring performance and risks	The park management entity has established and maintains a system for monitoring achievement of threshold EIP performance targets and management of critical risk factors within the park.	Park management entity maintains an EIP framework monitoring system in place, tracking: - Progress on environmental, social and economic performance at the park level annually. - Critical risk factors and related responses, at least for: ▪ Risk points where 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, earth-quakes); ▪ Environmental performance; ▪ Social performance; ▪ Economic performance; and	[Yes/No]

				▪ Critical risk management at the level of the park. - Acts as monitoring and pre-clearing institution for environ-mental issues on behalf of the regulatory bodies, as dele-gated. - May operate a central environment control unit with an emergency alert system for environmental and other hazards.	
4			The park management establishes measures to deal with climate change adaptation and disaster preparedness.	Park management has a plan in place, to be updated every seven years, to react to possible negative impacts due to climate change risks (heat waves and droughts, storms and floodwater events). All adaption needs for infrastructure and services are identified and in place for the industrial park to protect against climate change risks and potential damages. Park management entity and resident firms have plans and measures to ensure continued operation of critical infra-structure systems within the park (e.g., wastewater treatment plants, power plants, recycling facilities, etc.) that can be activated even in emergencies.	[Yes/No]
5		Climate risk assessment	The park management entity collects, assesses, and reviews comprehensive climate risk information specific to the location of the park.	Park management entity investigates risks due to climate change and updates this information on a regular basis.	[Yes/No]

6		Information on applicable regulations and standards	Park management has a good understanding of regulations and international standards applicable to industrial park compliance and enforces them in the park.	Park management entity has a system in place to comply with local/national regulations and international standards applicable to the industrial park. Park management enforces compliance by resident firms and requests and collects compliance information that firms share with the park management entity.	[Yes/No]
7	Planning and park design[1]	Master plan	A master plan for the EIP is developed by park developers and is applicable to both planning and operations by park managers.	A Master Plan (or equivalent planning document) for any new and existing industrial park has been developed and is reviewed periodically (minimum every seven years) and up-dated if required, including the following core elements: - Based on various risk analyses; essential and efficient infrastructure (onsite and offsite, in particular ensuring access to decent housing), utilities, transportation net-work; environmental and social issues; buffer zone around the park; procedure to safely locate high risk industries; and cluster synergistic industries and similar - Integration into Master Plan of relevant requirements specified in this EIP framework.	[Yes/No]

PERFORMANCE REQUIREMENTS

No.	Topic	Sub-topic	Description/Requirement	Performance Indicator	Unit [Target value]
8	Park management services	Park management empowerment	Distinct park management entity is empowered to provide and charge fees through a legally binding instrument.	Proportion of firms in the industrial park to have signed a residency contract/park charter/code of conduct (depending on what is legally binding on park firms according to the existing legislation in the country[2]) and additional legally binding arrangements that empower the park management entity to perform its responsibilities and tasks and charge fees (sometimes absorbed in rental fees) for common services. This may include transparent fees for services pertaining to the achievement of EIP performance targets.	Percent of firms [100%]
9		Park management entity property and common infrastructure operations	The park management entity provides and facilitates efficient common services and infrastructure to resident firms	Proportion of satisfied resident firms with regard to the pro-vision of services and common infrastructure by the park management's entity (or agency, where applicable) out of total respondents.	Percent of firms [75%]

1. While planning and design processes of an industrial park are most relevant for greenfield initiatives, the original, industrial park masterplan remains useful as a guide to park management regarding future expectations and plans.
2. In most developing countries, a park's charter or code of conduct may not be a legally binding instrument. Therefore, it would not provide the park management entity with the necessary powers.

ENVIRONMENTAL PERFORMANCE

PREREQUISITES					
No.	Topic	Sub-topic	Description/Requirement	Prerequisites/Evidence	Available?
10	Management and monito-ring	Environmental/ Energy Management Systems (EMS and EnMS, respectively)	The park has appropriate, functioning EMS and EnEMS systems (e.g., ISO 14001 and ISO 50001) in place to set and achieve targets, and covering key issues (e.g., energy, waste and material use; water; point-source emissions; and the natural environment)	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. For this purpose it records all relevant data, preferably managed by a dedicated environmental monitoring and recording unit/ group.	[Yes/No]
11			The park actively supports and facilitates industrial synergies and symbiosis.	Park management entity keeps updated records on energy, water, waste products, and materials inefficiencies and needs at tenant firms to provide a basis for industrial synergies development	[Yes/No]
12	Energy	Energy efficiency	Energy efficiency strategies are in place for the park management infrastructure and major energy-consuming resident firms.	Supporting programs (e.g., energy efficiency networks) are in place to improve the energy efficiency of major energy-consuming businesses in the park.	[Yes/No]
13		Energy network and waste heat recovery	A program/mechanism is in place to identify opportunities for common energy and heat exchange networks to be established. The park management will provide the	An industrial heat recovery strategy is in place to investigate opportunities for heat and energy recovery for the major thermal energy-consuming firms in the park. (Typically, these are firms that	[Yes/No]

			required physical network and offers support programs to assist resident firms with implementation.	individually consume at least 10-20% of total firm level energy consumption).	
14				Park management provides the physical network for waste heat/energy exchange at park level, and assists firms to connect to the network. A commonly accepted rewards system for waste heat/energy provision/use is in place.	[Yes/No]
15	Water supply and waste-water	Water efficiency, reuse and recycling	Water-saving and re-use plans are important to reducing total water consumption and manage water use. The industrial park may face challenges related to climate and non-climate related uncertain-ties that can shock and/or stress a system (land use changes, demographics, shifts in demand, etc.). The park and firms should have systems in place to increase water savings and reuse.	Park management entity has operational plans to increase water reuse in next five years. This would be achieved by either reuse of industrial effluents, or by rainwater/storm water collection.	[Yes/No]
16				Park management entity provides the physical network for water reuse/cascading of water	[Yes/No]

17	Waste and material use	Dangerous and toxic materials	Tenant firms are obliged to make as little use as possible of hazardous materials in their production process; to generate as little hazardous waste as possible, and to seek alternative materials.	Obeying the principles of good practices for the management of hazardous materials and waste as part of legally binding agreements.	[Yes/No]
18		Resource conservation	The park management and firms are obliged to consider circular economy principles and practices (e.g. circular products, using as little virgin raw material as possible, reuse and remanufacturing of components and parts and making extensive use of secondary/recycled materials generated in the park).	Obeying the principles of circular economy is part of the Park's Code of Conduct, and any legally binding agreement between tenant firms and the park authority	[Yes/No]
19		Treatment of waste	Waste generated in the production process is recovered, as far as possible, through sorting, cleaning, conditioning etc., so that it can be used as raw material for other firms in and outside of the park.	A central park facility or other mechanism is in place to treat waste that cannot be processed by individual firms.	[Yes/No]
20		Disposal of waste	Waste/secondary raw materials (including hazardous waste) leaving the park is being monitored to check that the material is either reused or further processed by authorised firms outside of the park, or disposed of according to legal and environmental standards.	A monitoring system is in place that controls and registers origin, type, mode and route of transport, and final destination of waste/secondary raw material leaving the park	[Yes/No]
21					[Yes/No]

	Climate change and the natural environment	Air, GHG emissions and pollution prevention	The park seeks to limit and mitigate pollution and GHG emissions, including air, waterway, and ground pollution. A set of measures at the park level is introduced (for instance, low-carbon technologies, energy efficiency measures, circular economy practices, waste heat recovery) to reduce GHG emissions.	A program is established with clear evidence of steps taken to monitor, mitigate and/or minimize GHG emissions, such as carbon dioxide (CO_2), methane (CH_4), and nitrogen oxide (NO_x).	
22				Reducing CO_2 emissions is an integral part of the park's code of conduct, which urges firms to reduce their carbon foot-print. The park acknowledges actions in this regard through an awards and incentive system.	[Yes/No]
23		Environmental assessment and ecosystem services	The industrial park demonstrates an understanding of the potential impact of park activities on priority ecosystem services in and around the vicinity of the park, and takes needed actions.	The park management entity has a plan in place to assess operational environmental impacts, and aims to limit the impact on prioritized local ecosystem services.	[Yes/No]
24				The park management implements measures to protect bio-diversity, and protects or creates natural/recreational areas in and surrounding the park.	[Yes/No]

PERFORMANCE INDICATORS					
No.	Topic	Sub-topic	Description/Requirement	Performance Indicator	Unit [Target value]
25	Management and monito-ring	Environmental/ Energy Management Systems (EMS	Firms have functioning and fit-for-purpose EMS/ EnMS systems. Summary information from these management systems is provided to park management, who	Proportion of a firm's energy consumption that is covered by an energy management system	Percent of energy consumption by firms to be covered

		and EnMS, respectively)	aggregate and report on data at the park level.		by an energy management system [10%]
26	Energy	Energy consumption	The industrial park has adequate metering and monitoring systems in place to measure energy consumption at both the park and firm levels.	Proportion of the park management and tenant firms that have a metering system in place.	Percent park facilities [100%]
27				Proportion of firm-level energy consumption that is monitored.	Percent firm-level energy consumption monitored [20%]
28		Renewable and clean energy	The industrial park leverages available renewable generation sources, with plans to increase contribution for shared services (for example, solar street lamps).	Total renewable energy use for electricity and heat production in the industrial park is equal to or greater than the renewable energy share in the annual national electricity mix in the grid.	National grid emission fac-tor[3] ≥ the combined CO_2 emissions inten-sity[4] as per unit of produced and purchased heat and electricity for use by EIP firms
29		Energy Efficiency	Energy efficiency opportunities should be actively identified at the park and firm levels to reduce	The equivalent of at least 10% of the total CO_2 emissions (Scope 1 and 2) at park level is covered by the	Percent CO_2 emissions covered by

			energy use and associated greenhouse gas emissions. EIPs should identify and promote technological and process-related interventions in their own and resident business operations.	percentage of firms that have a qualified energy efficiency certification (LEED, Industry EDGE, DGNB or ISO 50001 or their national equivalent).	the firms with energy management certification [10%]
30	Water supply and waste-water	Water consumption	A mechanism is in place to appropriately monitor water consumption across the park, and ensure demand management practices are in place in case of water stress. Extraction from water sources (such as rivers and groundwater sources) occurs at sustainable levels.[5]	Total water demand from firms in industrial park which do not have significant negative impacts on local water sources or local communities.	Percent water demand [100%]
31		Wastewater treatment	The industrial park has provisions in place to appropriately treat, recycle and reuse treated waste-water. No effluents significantly impact potable water resources and the health of local communities or nearby ecosystems.	Proportion of industrial wastewater generated by industrial park and resident firms which is treated to appropriate environmental standards.	Percent waste-water treated/ total waste-water [100%]
32		Water efficiency, reuse and recycling	The park and firms have systems in place to in-crease water savings and reuse.	Proportion of total industrial wastewater from firms in the park that is reused responsibly within or outside the industrial park.	Percent water reused or re-cycled/total water consumed [25%]
33					

		Waste/by-products re-use and recycling	A waste management plan with a program/mechanism in place to promote and encourage reuse and recycling of materials by firms in the park (for ex-ample, raw materials for process and non-process applications)	Proportion of non-hazardous, solid industrial waste genera-ted by firms that is reused-recycled by other firms, neighbouring communities, or municipalities.	Percent solid waste reused/ total waste [25%]
34	Waste and material use	Dangerous and toxic materials	Program/mechanism in place with clear targets to reduce, and avoid the use of, dangerous and hazardous materials by firms in the park.	Proportion of firms in park, which appropriately handle, store, transport and dispose of toxic and hazardous materials.	Percent of firms with programs for handling and disposing of hazardous materials [100%]
35		Resource Conservation	Circular economy practices (e.g., Industrial Symbiosis Networks, Exchange Platforms for waste and secondary raw materials, for reuse and recycling, etc.) are in place and used by firms. Circular economy practices consist of a) redesigning products for ease of reuse, remanufacturing, disassembly and recycling; b) reuse of waste and/or by-product with-in its own operations; c) collecting back and remanufacturing products or parts and components of products.	Proportion of manufacturing firms adopting circular economy practices, including engagement in Industrial Symbiosis Networks in the park; or actively exchanging secondary raw materials, or waste, or other circular economy practices.	Percent tenant firms participating in CE practices [20%]
36		Waste disposal			

			A waste management system with a systematic approach to collection, treatment, recycling and disposal of waste, and which correctly manages unusable waste materials (e.g., disposed of in proper landfills, burned in proper incinerator).	Waste generated by firms in the industrial park which is safely disposed of. Open burning of waste generated in an EIP is prohibited.	Percent industrial waste without re-processing, reuse or recycling options that go to sound disposal [100%]
37	Climate change and the natural environment	Flora and fauna	Native flora and fauna are important to maintain the proportion of natural areas. They are integrated within the industrial park and natural ecosystem where possible.	Proportion of open space[6] in the park used for native flora and fauna.	Percent open space [5%]
38		Air, GHG emissions and pollution prevention	A mechanism is in place to avoid, minimize, and/or mitigate significant point-source pollution and GHG emissions. Covering GHG gases (CO_2, methane [CH_4], nitrous oxide [N_2O], Chlorofluorocarbons [CFCs], and hydrofluorocarbons [HFCs]), local particulate and air pollution emissions such as $PM_{2.5}$, heavy metals (Hg, Cd, Pb and other relevant heavy metals), selected unintentional toxic organic pollutants (dioxins, PCDD/Fs). Program for on-site chemical management.	Proportion of firms in park which have pollution prevention and emission reduction strategies to reduce the intensity and mass flow of pollution/emission release which exceed national regulations.	Percent firms [50%]
39				Proportion of firms in industrial park which have a risk management framework in place that: (a) identifies activities which have an impact on the environment; (b) assigns a level of significance to each activity and; (c) have appropriate mitigation measures in place.	Percent firms [30%]

3. National Grid Emission factor is the measure of CO2 emissions intensity per unit of electricity generation in the national grid (kg CO2/kWh)
4. This should cover Scope 1 emissions: direct emissions from owned or controlled sources, and Scope 2 emissions: indirect emissions from the generation of purchased energy.
5. Sustainable levels refer to the rights/concessions allocated to incentivize lower water usage as compared to the business-as-usual baseline.
6. Open space refers to natural areas not allocated for industrial use but used to maintain native flora and fauna.

SOCIAL PERFORMANCE

PREREQUISITES					
No.	Topic	Sub-topic	Description/Requirement	Prerequisites/Evidence	Available?
40	Social management systems	Management team	Functioning system(s) are in place for ensuring social infrastructure provisioning, operations and performance, as well as collecting, monitoring, and managing key social information and impacts relevant to the industrial park.	Dedicated personnel exist (as part of the park management entity) to plan and manage social quality standards.	[Yes/No]
41	Social infra-structure	Primary social infrastructure	Social Infrastructure addresses different aspects to improve the living and working conditions of employees and neighbouring communities. Provision of fundamental social infrastructure is vital for employees' health and welfare, paying special attention to the needs of women. Primary social infra-structure covers *inter alia* adequate medical services, educational and training institutions, separate toilets and washing facilities, and provision of cafeterias and recreational areas.	Essential primary social infrastructure has been adequately provided in the site master plan, and is fully operational in the park. Gender perspectives are incorporated in the formulation, management and monitoring of plans and programs. A particular entity (e.g. planning unit or facilitated group of interested firm representatives) exists, which investigates and plans for future developments / challenges to the social environment due to the introduction of new technologies such as "Industry 4.0" and AI controlled production processes.	[Yes/No]

PERFORMANCE INDICATORS

No.	Topic	Sub-topic	Description/Requirement	Performance Indicator	Unit [Target value]
42	Social management systems	OH&S management system	Firms in the industrial park should have an OH&S management system in place (based on ISO 18001 standard), keep records about rates of injury, occupational diseases, absenteeism, as well as total numbers of work-related injuries and fatalities.	Proportion of firms in the industrial park with more than 250 employees that have an OH&S management system in place.	Percent firms [75%]
43		Grievance management	A grievance mechanism to receive and address grievances from within the industrial park and out-side the park. Examples include help desks, complaint boxes, and hotlines (phone booths) located inside and outside of the industrial park.	Proportion of grievances received by the park management entity which are which are responded to with statements of reasons within 14 days.	Percent grievances [100%]
44				Proportion of grievances received by the park management entity which are concluded within 60 days.	Percent grievances [100%]
45				Proportion of firms with more than 250 employees that have a code of conduct system in place to deal with grievances.	Percent firms [75%]
46		Discrimination and harassment prevention and response	Employees of the park management and resident firms should have a working environment free of violence, harassment, discrimination, exploitation or intimidation. A discrimination and harassment prevention and response system with clear	Proportion of firms with more than 250 employees that have a harassment prevention and response system in place.	Percent firms [75%]

			complaint and response procedures should be in place.		
47		Decent work	Conditions of employment should meet the following work criteria: - A fair income with security and social protection which allows access to decent housing. - Recognition of contractually agreed rights of workers and employees including - but not limited to - working hours, leave and maternity leave. - Establish and join organizations, of their own choosing, and without prior authorization, to re-present workers.	At least 80 percent of women and 80 percent of men of the surveyed workers agree that each of these decent work criteria are met.	[≥80%]
48	Social infra-structure	Primary social infrastructure	Social infrastructure should meet the norms and requirements of the workforce, and client expectations, paying special attention to the needs of female workers.	Proportion of surveyed employees' reporting satisfaction with social infrastructure.	Percent surveyed employees [80%]
49		Industrial park security	The industrial park has security systems and services that are fully operational and fit-for-purpose operation. Examples include, among others: appropriate lighting systems in and around the park, closed circuit television (CCTV) systems, a	Proportion of reported security and safety issues that are adequately addressed within 30 days.	Percent reported security and safety issues [100%]

			centralized security office, and provision of transport at night.		
50		Capacity building	Programs for skills training and development at park management and firm level are in place, emphasizing equal opportunity for skills training and career development, and addressing new technologies and changes in the labour market. Examples include training and skills development programs, and women entrepreneurship development programs.	Proportion of firms in park with more than 250 employees with a program for skills/ vocational training and development.	Percent firms [75%]
51				Proportion of underrepresented genders in workforce in the park management and firms who benefit from skills development programs.	Percent under-represented gender work-force [≥50%]

52	Local commu-nity outreach	Community dia-logue	Provision of established accessible communication platforms or other means to maintain regular dia-logue with the community and relevant civil society organizations. Examples include news bulletins, re-gular media releases, and information display boards.	Over 80% of surveyed community members satisfied with the community dialogue.	Percent surveyed community members [80%]
53		Community out-reach	The park management entity and resident firms en-gage in community outreach activities and main-tain documentation. These activities could include: an annual day with celebrations inside the park; clean-up drives or public service activities that are organized in the community areas by the park ma-nagement; infrastructure for community areas (for instance, drinking water supply, sanitation).	Number of outreach activities implemented by the park ma-nagement entity annually that are regarded as positive by over 80% of the surveyed community members.	Number of outreach acti-vities per year [2]

ECONOMIC PERFORMANCE

PREREQUISITES					
No.	Topic	Sub-topic	Description/Requirement	Prerequisites/Evidence	Available?
54	Local business and SME pro-motion	SME develop-ment	An EIP provides opportunities for local, regional, and national SMEs, enabling them to benefit from EIP activities.	Park management entity allows and promotes the establishment of SMEs that provide services and add value to park residents	[Yes/No]

55	Employment generation	Maximizing local benefits	An EIP must generate employment opportunities in the areas in which it operates to ensure revenue linkages and development opportunities.	Park management entity has plans to maximize local bene-fits.	[Yes/No]
56	Economic value creation	Market demand for EIP services and infrastruc-ture	The development of an EIP, including green infra-structure and services, must be based on realistic market and industry demands to ensure economic feasibility	A market demand and feasibility study, supported by a busi-ness plan~~,~~ for specific "green" infrastructure and services has been undertaken to justify planning and implementation in the industrial park.	[Yes/No]
57				Park management is financially solvent to operate/provide park infrastructure and services	[Yes/No]
58				The park management should be economically viable in terms of contributing to jobs, technology, and acting as a catalyst to development of local industry.	[Yes/No]

59				Park management entity is responsible for marketing the park and park concepts (EIP concept) to potential national and international investors.	[Yes/No]
60	Park entity's financial via-bility	Service delivery pricing	A dedicated financial model capturing EIP salient features must be used to set pricing levels and anti-cipated revenues in order to enhance financial via-bility of EIP investments.	The park management should render its services at realistic costs to cover operational expenditures.	[Yes/No]

PERFORMANCE CRITERIA					
No.	Topic	Sub-topic	Description/Requirement	Performance Indicator	Unit [Target value]
61	Employment generation	Type of employ-ment	The EIP provides longer term employment cont-racts to employees.	Proportion of total firm workers in industrial park employed through direct employment (that is, not employed on a fee-for-output basis or provided through a labor supply firm) and permanent contracts.	Percent em-ployees [30%]
62	Local business and SME pro-motion	Local value added	An EIP must look to local suppliers where possible. EIPs provide local businesses with the opportunity to grow.	Proportion of resident firms using local SME suppliers or ser-vice providers for at least 25 percent of their total procure-ment value.	Percent firms [25%]
63				Proportion of procurement paid to local service providers within 100 km radius by the park management entity.	Percent total procurement value of park management

					entity [90%]
64	Economic va-lue creation	Investment-ready park for firms	An EIP should be “investment ready” so that these parks can offer lower economic risks and better in-vestment opportunities to firms. Essential infras-tructure services should be offered by the indus-trial park, including access to water, energy, roads, and service corridors.	Percentage of space rented or used by resident firms com-pared to the total amount of available space earmarked for resident firms within the park.	Average per-cent occupan-cy rate over 15 years [50%]

ANNEX C: INTERNATIONAL EIP REQUIREMENTS WITH THEIR POLICY-RELATED CATEGORISATIONS

The following colour coding system is used in the following table to show which of the five policy-related categories each prerequisite and performance indicator has been assigned to.

	Prerequisites and performance indicators where there was no evidence that policies could either be a barrier to their implementation or could be supportive of their implementation
	Prerequisites and performance indicators where there was evidence that policies could be (more[a]) supportive of their implementation
	Specifically for industrial park management, prerequisites and performance indicators where there was evidence that, in countries with laws and regulations governing the establishment of industrial parks, these laws and regulations could be amended to better support their implementation by industrial park management
	» Prerequisites and performance indicators where there was evidence that existing policies could be a barrier, impeding their implementation
	Prerequisites and performance indicators where there was evidence that the absence of policies could be a barrier, impeding their implementation.

a. It could be that countries do have supportive policies in place, but those policies could be strengthened.

Note that more than one policy category can be assigned to individual prerequisites and performance indicators, for a variety of reasons; these are made clear in the comments column.

While the following table follows the format of the table in Annex B, certain columns from that table have been removed to focus more specifically on the prerequisites and performance indicators.

PARK MANAGEMENT

PREREQUISITES					
No.	Description/Requirement	Prerequisites/Evidence	Available?	Categorisation and comment	
1	A park management entity (or alternative agency, where applicable) exists to handle park planning, operations and management, and monitoring.	A distinct park management entity (or alter-native agency, where applicable) exists to handle park planning, operations and mana-gement, and monitoring.	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws required a distinct park management entity
2	The park management entity provides and facilitates common services and infrastruc-ture to resident firms to ensure smooth operations.	Park management entity to manage and maintain the industrial park property, com-mon infrastructure, and services as pres-cribed in the tenant contract and the park's Master Plan. This should include, but is not limited to the following: - Property management, including plot allot-ments, re-allotments, development, land use monitoring. - Utilities, roads, security (including IT secure-ty) and emergency response services/faci-lities and wastewater treatment plants and operations, including waste heat/energy recovery and distribution networks. - Environmental monitoring and advisory activities.	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws set out the responsibili-ties listed here for park management.

		- Common landscaping, buffer zones, street lighting, security surveillance and street cleaning. - Provide facilitating services to and between tenant firms (for example, networking, collaboration and training opportunities). - Engagement with the park's stakeholders and business representatives. - PR and community participation center / platform / activities			

3	The park management entity has established and maintains a system for monitoring achie-vement of threshold EIP performance targets and manage-ment of critical risk factors with-in the park.	Park management entity maintains an EIP framework monitoring system in place, tracking: - Progress on environmental, social and eco-nomic performance at the park level an-nually. - Critical risk factors and related responses, at least for: ▪ Risk points where the accidental release of hazardous solid, liquid and gaseous ef-fluents, including during transportation and disposal when fire hazards are pos-sible; ▪ Applicable natural disaster risks (for ex-ample, earthquakes); ▪ Environmental performance; ▪ Social performance; ▪ Economic performance; and ▪ Critical risk management at the level of the park. - Acts as monitoring and pre-clearing institu-tion for environmental issues on behalf of the regulatory bodies, as delegated.	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws made it a responsibility of the park management entity to create and maintain a framework monitoring system containing the factors listed here. In the specific case of the park management entity "act[ing] as monitoring and pre-clearing institution for environmental issues on behalf of regulatory bodies", this clearly cannot occur in the absence of specific regulatory delegation to this effect in the relevant laws and regulations – as recognised in the word-ing of the prerequisite where the phrase "as delegated" has been added. See also requirement no. 6.

		- May operate a central environment control unit with an emergency alert system for environmental and other hazards.			
4	The park management establishes measures to deal with climate change adaptation and disaster preparedness.	Park management has a plan in place, to be updated every seven years, to react to pos-sible negative impacts due to climate change risks (heat waves and droughts, storms and floodwater events). All adaptation needs for infrastructure and services are identified and in place for the industrial park to protect ag-ainst climate change risks and potential da-mages. Park management entity and resident firms have plans and measures to ensure con-tinued operation of critical infrastructure systems within the park (e.g., wastewater treatment plants, power plants, recycling facilities, etc.) that can be activated even in emergencies.	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws made it a responsibility of the park management entity to create and maintain a plan as described here.
5	The park management entity collects, asses-ses, and reviews	Park management entity investigates risks due to climate	[Yes/No]		In countries where IPs are established by law, it would helpful

	comprehensive climate risk information specific to the location of the park.	change and updates this infor-mation on a regular basis.			implementation of this prere-quisite if these laws made it a responsibility of the park management entity to undertake the climate risk assessments described here.
6	Park management has a good understanding of regulations and international standards applicable to industrial park compliance and enforces them in the park.	Park management entity has a system in pla-ce to comply with local/national regulations and international standards applicable to the industrial park. Park management enforces compliance by resident firms and requests and collects compliance information that firms share with the park management entity.	[Yes/No]		With respect to the park management entity enforcing compliance by resident firms, this clearly cannot occur in the absence of specific regulatory delegation to this effect in the relevant laws and regulations. See also requirement no. 3.
7	A master plan[1] for the EIP is developed by park developers and is applicable to both planning and operations by park managers.	A Master Plan (or equivalent planning do-cument) for any new and existing industrial park has been developed and is reviewed pe-riodically (minimum every seven years) and updated if required, including the following core elements: - Based on various risk analyses; essential and efficient infrastructure (onsite and offsite, in particular ensuring access to decent hou-sing),	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws required that such Mas-ter Plans be developed and maintained. With respect specifically to the locating of high risk industries within the park, it would also be helpful if at a minimum the govern-ment published formal guidelines on this

		utilities, transportation network; environmental and social issues; buffer zone around the park; procedure to safely locate high risk industries; and cluster synergistic industries and similar - Integration into Master Plan of relevant re-quirements specified in this EIP framework.			topic which park management entities could follow rather than having to develop their own procedures. A Master Plan can only be properly developed if the relevant government authorities have allocated sufficient land for the park to have all the common infrastructure (internal roads, shared utilities, buffer zones, etc.) for the number of tenant firms required to make the IP economically viable. There is evidence that this is not always the case, thus creating a barrier to a park's ability to implement all the EIP requirements. The Master Plan is also the instrument for en-suring decent housing for the workers in the IP. Since all workers' housing is outside the park, in the surrounding community, this as-pect of the Master Plan can only be satisfied if the relevant government authorities ensure that sufficient housing is made available for all the workers the IP will employ. There is evidence

					that this is not always the case, thus creating a barrier to a park's ability to imple-ment all the EIP requirements.

PERFORMANCE INDICATORS					
No.	Description/Requirement	Performance Indicator	Unit [Target value]	Categorisation and comment	
8	Distinct park management entity is empow-ered to provide and charge fees through a legally binding instrument.	Proportion of firms in the industrial park to have signed a residency contract/park char-ter/code of conduct (depending on what is legally binding on park firms according to the existing legislation in the country[2]) and addi-tional legally binding arrangements that em-power the park management entity to per-form its responsibilities and tasks and charge fees (sometimes absorbed in rental fees) for common services. This may include transpa-rent fees for services pertaining to the ach-ievement of EIP performance targets.	Percent of firms [100%]		According to the footnote, "In most develop-ping countries, a park's charter or code of conduct may not be a legally binding instru-ment. Therefore, it would not provide the park management entity with the necessary powers." This would be a barrier to proper implementation of this performance indicator and suggests that laws may need to be changed to make parks' charters or codes of conduct legally binding instruments.
9	The park management entity provides and facilitates efficient	Proportion of satisfied resident firms with regard to the provision			

	common services and infrastructure to resident firms	of services and com-mon infrastructure by the park manage-ment's entity (or agency, where applicable) out of total respondents.	Percent of firms [75%]		

1. While planning and design processes of an industrial park are most relevant for greenfield initiatives, the original, industrial park masterplan remains useful as a guide to park management regarding future expectations and plans.
2. In most developing countries, a park's charter or code of conduct may not be a legally binding instrument. Therefore, it would not provide the park management entity with the necessary powers.

ENVIRONMENTAL PERFORMANCE

PREREQUISITES				
No.	Description/Requirement	Prerequisites/Evidence	Available?	Categorisation and comment
10	The park has appropriate, functioning EMS and EnEMS systems (e.g., ISO 14001 and ISO 50001) in place to set and achieve targets, and covering key issues (e.g., energy, waste and material use; water; point-source emis-sions; and the natural environment)	Park management entity operates an environ-mental/ energy management system in line with internationally certified standards, moni-toring park performance and supporting resi-dent firms in the maintenance of their own firm-level management systems. For this pur-pose it records all relevant data, preferably managed by a dedicated environmental monitoring and recording unit/ group.	[Yes/No]	Government policies aimed at supporting the uptake of EMSs and/or EnMSs would be use-ful. The relevant policies could be: - free/subsidised training programs on how to set up the EMS/EnMS; - free/subsidised services of external experts to support the resident firms and park ma-nagement entity; - free/subsidised audits; - grants/subsidised loans for resident firms to purchase the necessary green/clean techno-logies. It will also be very supportive if the govern-ment can put in place the required accredita-tion system to ensure that the necessary national certification bodies exist to give the park management entity and the resident firms the relevant certifications (they could use international certification bodies,

					but they tend to be much more expensive). Finally, in countries where IPs are established by law, it would help park management entities implement this prerequisite if these laws required them to adopt these manage-ment systems.
11	The park actively supports and facilitates in-dustrial synergies and symbiosis.	Park management entity keeps updated re-cords on energy, water, waste products, and materials inefficiencies and needs at tenant firms to provide a basis for industrial syner-gies development	[Yes/No]		

12	Energy efficiency strategies are in place for the park management infrastructure and ma-jor energy-consuming resident firms.	Supporting programs (e.g., energy efficiency networks) are in place to improve the energy efficiency of major energy-consuming busi-nesses in the park.	[Yes/No]		Although park management entities could establish these supporting programs alone, policies supporting them in doing this could be useful. The relevant policies could be: - free/subsidised training programs on how to improve energy efficiency; - free/subsidised services of external experts to support the enterprises; - free/subsidised audits; - grants/subsidised loans for firms to pur-chase the necessary green/clean technolo-gies; - subsidised R&D to identify suitable energy efficient technologies or practices.
13	A program/mechanism is in place to identify opportunities for common energy and heat exchange networks to be established. The park management will provide the required physical network and offers support programs to assist resident firms with implementation.	An industrial heat recovery strategy is in place to investigate opportunities for heat and en-ergy recovery for the major thermal energy-consuming firms in the park. (Typically, these are firms that individually consume at least 10-20% of total firm level energy consump-tion).	[Yes/No]		Since the purpose of such a strategy is to ev-entually lead to implementation of the oppor-tunities identified, government policies could support this in two important ways: - where opportunities are already well defined, by making grants/cheap loans available to finance these opportunities; - where they are not well defined, by subsidising the

					necessary R&D to properly define the opportunities.
14		Park management provides the physical net-work for waste heat/energy exchange at park level, and assists firms to connect to the network. A commonly accepted rewards sys-tem for waste heat/energy provision/use is in place.	[Yes/No]		In cases where the government allows the investors in an IP to access the country's fi-nancial markets, government policies could support the installation of this physical net-work by allowing park investors access to cheap loans to finance its installation.

15	Water-saving and re-use plans are important to reducing total water consumption and ma-nage water use. The industrial park may face challenges related to climate and non-climate related uncertainties that can shock and/or stress a system (land use changes, demogra-phics, shifts in demand, etc.). The park and firms should have systems in place to increase water savings and reuse.	Park management entity has operational plans to increase water reuse in next five years. This would be achieved by either reuse of industrial effluents, or by rainwater/storm water collection.	[Yes/No]		<u>Water savings</u>: Government policies could support tenant firms in their efforts to save water, by offering training, information dissemination, cheap loans for investing in technology, etc. <u>Collection and reuse of rainwater/storm-water</u>: Policies will not affect implementation positively or negatively <u>Reuse of industrial effluents</u>: This is an area where explicit policy barriers exist. The barrier takes one of two forms: (1) Policies simply prohibit the reuse of indus-trial effluents, even by other industrial enter-prises. (2) Policies allow the reuse of industrial efflu-ents, but only if they meet quality criteria; however, since regulations are required to specify those quality criteria but have not been passed, the net effect

					is that the reuse of industrial effluents is prohibited.
16		Park management entity provides the physi-cal network for water reuse/cascading of water	[Yes/No]		In cases where the government allows the investors in an IP to access the country's fi-nancial markets, government policies could support the installation of this physical net-work by allowing park investors access to cheap loans to finance its installation. (With respect to industrial effluents, installing a physical network is subject to the reuse of industrial effluents being allowed – see no. 15)

17	Tenant firms are obliged to make as little use as possible of hazardous materials in their production process; to generate as little ha-zardous waste as possible, and to seek alter-native materials.	Obeying the principles of good practices for the management of hazardous materials and waste as part of legally binding agreements.	[Yes/No]		This is an area where explicit policy barriers exist. The form of the barrier is to prohibit the reuse of hazardous wastes. The prerequisite seems to implicitly endorse this prohibition since it does not give the reuse of these wastes as an option. But there could well be cases of potential industrial symbiosis where hazardous wastes could be used as a raw material. For the options of reducing the hazardous materials used and the hazardous wastes ge-nerated, and of identifying alternatives, go-vernment policies aimed at supporting these efforts would be useful. The relevant policies could be: - free/subsidised training programs; - free/subsidised services of external experts to support the resident firms; - free/subsidised audits; - grants/subsidised loans for resident firms to purchase the necessary green/clean tech-nologies;

					- subsidised R&D, especially to identify alternatives. The prerequisite assumes the existence of "principles of good practices for the manage-ment of hazardous materials and waste". Government policies could support the imple-mentation of this prerequisite by publishing a guidance document on what these principles are.
18	The park management and firms are obliged to consider circular economy principles and practices (e.g. circular products, using as little virgin raw material as possible, reuse and re-manufacturing of components and parts and making extensive use of secondary/recycled materials generated in the park).	Obeying the principles of circular economy is part of the Park's Code of Conduct, and any legally binding agreement between tenant firms and the park authority	[Yes/No]		As described above and below, some types of industrial symbiosis projects – an important component of circular economy practices for IPs – could be prohibited by law. Also, there could be barriers to some circular economy practices such as remanufacturing if waste

					laws which define "cores" going to re-manufacturing as "waste". Since circular economy is a new concept for many enterprises, government policies aimed at building up enterprises' knowledge could be very useful. The relevant policies could be: - free/subsidised training programs; - free/subsidised services of external experts to support the resident firms; - free/subsidised audits; - grants/subsidised loans for resident firms to purchase the necessary green/clean tech-nologies; Because most enterprises do not yet know very well what their circular economy options are, government policies could usefully sup-port efforts by subsidising R&D into circular economy options. Government policies could support the park management entity and resident firms in their efforts to use

					as little virgin raw mate-rials as possible by removing any subsidies given to virgin raw materials, to "level the economic playing field".
19	Waste generated in the production process is recovered, as far as possible, through sorting, cleaning, conditioning etc., so that it can be used as raw material for other firms in and outside of the park.	A central park facility or other mechanism is in place to treat waste that cannot be proces-sed by individual firms.	[Yes/No]		Waste management laws often create an au-thorisation system whereby only authorised enterprises are allowed to transport, recycle, treat, or dispose of waste. This means that, unless these laws provide exemptions for wastes being reused, enterprises wishing to reuse industrial wastes as a raw material will only be able to do so if they are authorised. This need for authorisation can be an important barrier. These authorisation regimes would probably mean that “a central park facility or other mechanism" would be required to have an authorisation as a waste treatment company. This could be an important barrier for park management entities.

20	Waste/secondary raw materials (including ha-zardous waste) leaving the park is being mo-nitored to check that the material is either re-used or further processed by authorised firms outside of the park, or disposed of according to legal and environmental standards.	A monitoring system is in place that controls and registers origin, type, mode and route of transport, and final destination of waste/se-condary raw material leaving the park	[Yes/No]		This prerequisite is describing a waste mani-fest system. This is part of many waste mana-gement laws and is used as an enforcement instrument by government inspectors, to check that wastes are indeed being managed the way the generators claim they are being managed. Whether or not the national waste manage-ment laws have a waste manifest system, the park management entity cannot undertake the monitoring role assumed in this prerequi-site unless the regulations delegate it this authority to it. Without such a delegation, the park management entity has no authority to monitor the fate of wastes leaving the park. See also nos. 3 and 6.
21	The park seeks to limit and mitigate pollution and GHG emissions, including air, waterway, and ground pollution. A set of measures at the park level is introduced (for instance, low-carbon technologies, energy efficiency mea-sures, circular economy practices, waste	A program is established with clear evidence of steps taken to monitor, mitigate and/or minimize GHG emissions, such as carbon di-oxide (CO_2), methane (CH_4), and nitrogen ox-ide (NO_x).	[Yes/No]		It would be helpful if the government had policies - training, information dissemination, etc. - which could support tenant firms to identify and assess their options to mitigate and minimise their pollution and GHG-emissions.

	heat recovery) to reduce GHG emissions.				Where the park management entity or the resident firms need to adopt green/clean technologies to mitigate or minimise their GHG emissions, government policies could support these efforts by allowing the park management entity and the tenant firms to access cheap loans. Government policies could also support ef-forts by offering subsidised R&D funds to al-low the park management entity and the te-nant firms to explore options with less of a track record.
22		Reducing CO_2 emissions is an integral part of the park's code of conduct, which urges firms to reduce their carbon foot-print. The park acknowledges actions in this regard through an awards and incentive system.	[Yes/No]		
23	The industrial park demonstrates an under-standing of the potential impact of park acti-vities on priority ecosystem services in and around the vicinity of the park, and takes nee-ded actions.	The park management entity has a plan in place to assess operational environmental im-pacts, and aims to limit the impact on priori-tized local ecosystem services.	[Yes/No]		This prerequisite implies an EIA, which would require the park management entity to have just such a plan in place. All the GEIPP coun-tries have requirements that parks undertake an EIA. A critical issue is whether or not indi-vidual

					tenant firms should also do EIAs. Go-vernment could ease the burden of underta-king EIAs if the policies allowed just one EIA to be done by park management entity, ba-sed on the management's predictions of what type of tenant firms would be coming into the park. The EIA would be formally updated whenever new tenant firms arrive/old tenant firms leave but would only require formal re-approval by government if a new tenant firm substantially changed the initial assumptions about types of impacts, etc.
24		The park management implements measures to protect biodiversity, and protects or crea-tes natural/recreational areas in and sur-rounding the park.	[Yes/No]		The ability of a park to create natural/recrea-tional areas in the park will very much de-pend on the availability of sufficient land in the park itself. This in turn depends on whe-ther or not this was properly considered in the Master Plan – see no. 7. The ability to do this in the area surrounding the park will absolutely depend on the local (or other relevant) authorities giving them access to the necessary land.

PERFORMANCE INDICATOR					
No.	Description/Requirement	Performance Indicator	Unit [Target value]	Categorisation and comments	
25	Firms have functioning and fit-for-purpose EMS/ EnMS systems. Summary information from these management systems is provided to park management, who aggregate and re-port on data at the park level.	Proportion of a firm's energy consumption that is covered by an energy management system	Percent of energy con-sumption by firms to be covered by an energy mana-gement system [10%]		Government policies aimed at supporting the uptake of EMSs and/or EnMSs by resident firms would be useful. The relevant policies could be: - free/subsidised training programs on how to set up the EMS/EnMS; - free/subsidised services of external experts to support the resident firms and park ma-nagement entity; - free/subsidised audits; - grants/subsidised loans for resident firms to purchase the necessary green/clean techno-logies. It will also be very supportive if the govern-ment can put in place the required accredita-tion system to ensure that the necessary national certification bodies exist to give the park management entity and the resident firms the relevant certifications (they could use international certification bodies,

					but they tend to be much more expensive).
26	The industrial park has adequate metering and monitoring systems in place to measure energy consumption at both the park and firm levels.	Proportion of the park management and tenant firms that have a metering system in place.	Percent park facilities [100%]		
27		Proportion of firm-level energy consumption that is monitored.	Percent firm-level energy consumption monitored [20%]		

28	The industrial park leverages available renew-able generation sources, with plans to inc-rease contribution for shared services (for example, solar street lamps).	Total renewable energy use for electricity and heat production in the industrial park is equal to or greater than the renewable energy share in the annual national electricity mix in the grid.	National grid emission fac-tor[3] ≥ the com-bined CO_2 em-issions inten-sity[4] as per unit of produ-ced and pur-chased heat and electricity for use by EIP firms		This is an area where explicit policy barriers exist. The form of the barrier is to limit the size of RE systems which can be installed; this maximum size appears quite small, with enterprises in IPs able in principle to host bigger systems. If the barrier is removed, this could also be an area where government policies could sup-port efforts, through: - free/subsidised training programs on how to assess for RE options; - free/subsidised services of external experts to support the resident firms and park ma-nagement entity; - free/subsidised audits; - grants/subsidised loans for resident firms to purchase the necessary green/clean techno-logies; - subsidised R&D in cases where options are not clear.
29	Energy efficiency opportunities should be ac-tively identified at the	The equivalent of at least 10% of the total CO_2 emissions (Scope 1	Percent CO_2		Government policies can support efforts here by ensuring that the

	park and firm levels to reduce energy use and associated greenhouse gas emissions. EIPs should identify and pro-mote technological and process-related inter-ventions in their own and resident business operations.	and 2) at park level is co-vered by the percentage of firms that have a qualified energy efficiency certification (LEED, Industry EDGE, DGNB or ISO 50001 or their national equivalent).	emissions co-vered by the firms with en-ergy manage-ment certifica-tion [10%]		required accreditation system is in place to ensure that the necessa-ry national certification bodies exist (tenant firms can also use international certification bodies, but they tend to be much more ex-pensive). To the extent that meeting this performance indicator means that tenant firms need to in-stall new technologies, government policies can support this by making grants/cheap loans available.

30	A mechanism is in place to appropriately mo-nitor water consumption across the park, and ensure demand management practices are in place in case of water stress. Extraction from water sources (such as rivers and groundwa-ter sources) occurs at sustainable levels.[5]	Total water demand from firms in industrial park which do not have significant negative impacts on local water sources or local communities.	Percent water demand [100%]		The footnote specifies that "sustainable le-vels" relates to rights/concessions allocated to the park. This in turn implies that there are government policies allocating these rights and concessions. If these policies are not in place, this will be a barrier to the performan-ce indicator being implemented.
31	The industrial park has provisions in place to appropriately treat, recycle and reuse treated wastewater. No effluents significantly impact potable water resources and the health of local communities or nearby ecosystems.	Proportion of industrial wastewater genera-ted by industrial park and resident firms which is treated to appropriate environmen-tal standards.	Percent waste-water treated/ total waste-water [100%]		Wastewater treatment: What is considered "appropriate treatment" is normally set by law. So policies are required setting discharge standards for the park to be able to meet this performance indicator. It seems that most countries do have such policies (it is certainly the case in the GEIPP countries), although it would be necessary to ensure that the stan-dards cover all the necessary parameters. Water reuse: See no. 15 above
32	The park and firms have systems in place to increase water savings and reuse.	Proportion of total industrial wastewater from firms in the park that is reused respon-sibly within or outside the industrial park.	Percent water reused or re-cycled/total water		Water savings: Government policies could support tenant firms in their efforts to save water, by offering training, information dissemination, cheap loans for investing in technology, etc.

			consu-med [25%]		Water reuse: See nos. 15 and 31 above

33	A waste management plan with a program/ mechanism in place to promote and encou-rage reuse and recycling of materials by firms in the park (for example, raw materials for process and non-process applications)	Proportion of non-hazardous, solid industrial waste generated by firms that is reused-recy-cled by other firms, neighbouring communi-ties, or municipalities.	Percent solid waste reused/ total waste [25%]		Normally, waste management laws do not allow entities to take industrial wastes from enterprises unless they are authorised waste management companies. This would mean that only authorised recycling companies could take these wastes, which would be a strong barrier to the industrial symbiosis ap-plications implied in the performance indica-tor. Governments can avoid this problem by inserting into the laws exclusions of one form or another (e.g., by excluding "by-products" from the definition of what constitutes an industrial waste). There is a barrier, which is specific to Free Trade Zones or equivalent, to the implemen-tation of this performance indicator. Their special fiscal status normally restricts the movement of materials between the zone and the surrounding economy, especially if the materials are paid for. This could make it difficult if not impossible to do industrial symbiosis projects with the surrounding community.

34	Program/mechanism in place with clear tar-gets to reduce, and avoid the use of, dange-rous and hazardous materials by firms in the park.	Proportion of firms in park, which appropri-ately handle, store, transport and dispose of toxic and hazardous materials.	Percent of firms with programs for handling and disposing of hazardous materials [100%]		Government policies could support the imple-mentation of this performance indicator by publishing a waste management regulation which gives clear guidance on what constitu-tes “appropriate” handling and storage of toxic and hazardous materials. For the options of reducing the hazardous materials used and the hazardous wastes ge-nerated, and of identifying alternatives, go-vernment policies aimed at supporting these efforts would be useful. The relevant policies could be: - free/subsidised training programs; - free/subsidised services of external experts to support the resident firms; - free/subsidised audits; - grants/subsidised loans for resident firms to purchase the necessary green/clean tech-nologies; - subsidised R&D, especially to identify alternatives.

					Most, if not all, waste management laws state that toxic and hazardous materials and waste must be transported by authorised transport-ters and, in the case of wastes, treated and disposed of by authorised waste management companies. If the government has not autho-rised sufficient numbers of transporters of toxic hazardous materials and waste, and/ or sufficient numbers of treaters and disposers of hazardous waste, this would be a barrier to the proper implementation of this performan-ce indicator.
35	Circular economy practices (e.g., Industrial Symbiosis Networks, Exchange Platforms for waste and secondary raw materials, for reuse and recycling, etc.) are in place and used by firms. Circular economy practices consist of a) redesigning products for ease of reuse, rema-nufacturing, disassembly and recycling; b) reuse of waste and/or byproduct within its own operations; c) collecting back and rema-nufacturing products or parts and compo-nents of products.	Proportion of manufacturing firms adopting circular economy practices, including engage-ment in Industrial Symbiosis Networks in the park; or actively exchanging secondary raw materials, or waste, or other circular econo-my practices.	Percent tenant firms participa-ting in CE prac-tices [20%]		As described above (see nos. 15, 17, 18, 19, 31, 32, 33), there could be important barriers to some types of industrial symbiosis projects because they are prohibited by law. Remanufacturing could be stymied by waste laws which define "cores" going to remanufacturing as "waste"; the need to be authorised as a waste management company to take cores could be a major barrier.
36	A waste management system with a systema-tic approach to	Waste generated by firms in the industrial park which is safely	Percent indus-trial		If the government has not authorised suffi-cient numbers of

	collection, treatment, recy-cling and disposal of waste, and which correc-tly manages unusable waste materials (e.g., disposed of in proper landfills, burned in proper incinerator).	disposed of. Open bur-ning of waste generated in an EIP is prohibit-ted.	waste wi-thout repro-cessing, reuse or recycling options that go to sound dis-posal [100%]		transporters, recyclers, trea-ters and disposers of waste, this would be a barrier to the proper implementation of this performance indicator. The prohibition on open burning within the park is something the park management en-tity can do without the need for policy.
37	Native flora and fauna are important to main-tain the proportion of natural areas. They are integrated within the industrial park and na-tural ecosystem where possible.	Proportion of open space[6] in the park used for native flora and fauna.	Percent open space [5%]		Government policies could support the imple-mentation of this performance indicator by publishing formal guidance on what species of native flora and fauna it would like parks to maintain. NOTE: It is also necessary to ensure that this requirement for space has been taken into consideration in the Master Plan

38	A mechanism is in place to avoid, minimize, and/or mitigate significant point-source pollu-tion and GHG emissions. Covering GHG gases (CO_2, methane [CH_4], nitrous oxide [N_2O], Chlorofluorocarbons [CFCs], and hydrofluoro-carbons [HFCs]), local particulate and air pol-lution emissions such as $PM_{2.5}$, heavy metals (Hg, Cd, Pb and other relevant heavy metals), selected unintentional toxic organic pollu-tants (dioxins, PCDD/Fs). Program for on-site chemical management.	Proportion of firms in park which have pollu-tion prevention and emission reduction stra-tegies to reduce the intensity and mass flow of pollution/emission release which exceed national regulations.	Percent firms [50%]		Policies are required setting emissions stan-dards for the park to be able to meet this performance indicator. It seems that most countries do have such policies (it is certainly the case in the GEIPP countries), although it would be necessary to ensure that the stan-dards cover all the necessary parameters. The implementation of this performance indi-cator presupposes that there are sufficient la-boratories available to make the necessary measurements of pollutants, and that mea-surement procedures have been formally recognised in a regulation, so that everyone is using the same measurement methodologies. So governments could support efforts here by (a) ensuring that the necessary laboratories are established and duly certified, and (b) en-acting regulations specifying the measure-ment methods to be used. Government policies could also support ten-ant firms to identify

					and assess their pollution prevention and emission reduction options by offering training, information dissemination, cheap loans if green/clean technologies are required, etc.
39		Proportion of firms in industrial park which have a risk management framework in place that: (a) identifies activities which have an impact on the environment; (b) assigns a level of significance to each activity and; (c) have appropriate mitigation measures in place.	Percent firms [30%]		Government policies could support efforts here by publishing formal guidance on prepa-ring a risk management framework. The policies could also offer support through training, information dissemination, and ma-king third-party experts available.

3. National Grid Emission factor is the measure of CO_2 emissions intensity per unit of electricity generation in the national grid (kg CO_2/kWh)
4. This should cover Scope 1 emissions: direct emissions from owned or controlled sources, and Scope 2 emissions: indirect emissions from the generation of purchased energy.
5. Sustainable levels refer to the rights/concessions allocated to incentivize lower water usage as compared to the business-as-usual baseline.
6. Open space refers to natural areas not allocated for industrial use but used to maintain native flora and fauna.

SOCIAL PERFORMANCE

PREREQUISITES					
No.	Description/Requirement	Prerequisites/Evidence	Available?	Categorisation and comments	
40	Functioning system(s) are in place for ensu-ring social infrastructure provisioning, opera-tions and performance, as well as collecting, monitoring, and managing key	Dedicated personnel exist (as part of the park management entity) to plan and manage social quality standards.	[Yes/No]		

	social informa-tion and impacts relevant to the industrial park.				
41	Social Infrastructure addresses different as-pects to improve the living and working con-ditions of employees and neighbouring com-munities. Provision of fundamental social infrastructure is vital for employees' health and welfare, paying special attention to the needs of women. Primary social infrastructure covers *inter alia* adequate medical services, educational and training institutions, separate toilets and washing facilities, and provision of caféterias and recreational areas.	Essential primary social infrastructure has been adequately provided in the site master plan, and is fully operational in the park. Gen-der perspectives are incorporated in the for-mulation, management and monitoring of plans and programs. A particular entity (e.g. planning unit or facilitated group of interes-ted firm representatives) exists, which investi-gates and plans for future developments / challenges to the social environment due to the introduction of new technologies such as "Industry 4.0" and AI controlled production processes.	[Yes/No]		

PERFORMANCE INDICATORS					
No.	Description/Requirement	Performance Indicator	Unit [Target value]	Categorisation and comments	
42	Firms in the industrial park should have an OH&S management system in place (based on ISO 18001 standard), keep records about rates of injury, occupational diseases, absen-teeism, as well as total	Proportion of firms in the industrial park with more than 250 employees that have an OH&S management system in place.	Percent firms [75%]		If it is expected that these management sys-tems would be certified, government policies could support efforts by ensuring that the accreditation system is in place to ensure that the necessary national certification bodies exist

	numbers of work-rela-ted injuries and fatalities.				(international certification bodies can also be used, but they tend to be much more expensive).
43	A grievance mechanism to receive and add-ress grievances from within the industrial park and outside the park. Examples include help desks, complaint boxes, and hotlines (phone booths) located inside and outside of the industrial park.	Proportion of grievances received by the park management entity which are which are responded to with statements of reasons within 14 days.	Percent grievances [100%]		
44		Proportion of grievances received by the park management entity which are concluded within 60 days.	Percent grievances [100%]		
45		Proportion of firms with more than 250 employees that have a code of conduct system in place to deal with grievances.	Percent firms [75%]		
46	Employees of the park management and resi-dent firms should have a working environ-ment free of violence, harassment, discrimi-nation, exploitation or intimidation. A discri-mination and harassment prevention and res-ponse system with clear complaint and res-ponse procedures should be in place.	Proportion of firms with more than 250 employees that have a harassment prevention and response system in place.	Percent firms [75%]		
47		At least 80 percent of women and 80 percent of men of the surveyed	[≥80%]		

	Conditions of employment should meet the following work criteria: - a fair income with security and social pro-tection which allows access to decent hou-sing. - recognition of contractually agreed rights of workers and employees including - but not limited to - working hours, leave and mater-nity leave. - establish and join organizations, of their own choosing, and without prior authoriza-tion, to represent workers.	workers agree that each of these decent work criteria are met.			
48	Social infrastructure should meet the norms and requirements of the workforce, and client expectations, paying special attention to the needs of female workers.	Proportion of surveyed employees' reporting satisfaction with social infrastructure.	Percent surveyed employees [80%]		

49	The industrial park has security systems and services that are fully operational and fit-for-purpose operation. Examples include, among others: appropriate lighting systems in and ar-ound the park, closed circuit television (CCTV) systems, a centralized security office, and provision of transport at night.	Proportion of reported security and safety issues that are adequately addressed within 30 days.	Percent repor-ted security and safety issues [100%]		
50	Programs for skills training and development at park management and firm level are in place, emphasizing equal opportunity for skills training and career development, and addressing new technologies and changes in the labour market. Examples include training and skills development programs, and women entrepreneurship development pro-grams.	Proportion of firms in park with more than 250 employees with a program for skills/voca-tional training and development.	Percent firms [75%]		
51		Proportion of underrepresented genders in workforce in the park management and firms who benefit from skills development pro-grams.	Percent under-represented gender work-force [≥50%]		
52	Provision of established accessible communi-cation platforms or other means to maintain regular dialogue with the community and re-levant civil society organizations. Examples in-clude news bulletins, re-gular media releases, and information display boards.	Over 80% of surveyed community members satisfied with the community dialogue.	Percent surveyed community members [80%]		
53	The park management entity and resident firms engage in	Number of outreach activities implemented by the park	Number of outreach		

	community outreach activities and maintain documentation. These activities could include: an annual day with celebra-tions inside the park; clean-up drives or public service activities that are organized in the community areas by the park management; infrastructure for community areas (for ins-tance, drinking water supply, sanitation).	management entity annually that are regarded as positive by over 80% of the surveyed community members.	acti-vities per year [2]		

ECONOMIC PERFORMANCE

PREREQUISITES					
No.	Description/Requirement	Prerequisites/Evidence	Available?	Categorisation and comments	
54	An EIP provides opportunities for local, regio-nal, and national SMEs, enabling them to benefit from EIP activities.	Park management entity allows and promotes the establishment of SMEs that provide servi-ces and add value to park residents	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws required that this aspect be taken into account
55	An EIP must generate employment opportuni-ties in the areas in which it operates to ensure revenue linkages and development opportu-nities.	Park management entity has plans to maximi-ze local benefits.	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws required park manage-ment entities to maximise local benefits
56	The development of an EIP, including green infrastructure and services, must be based on realistic market and industry demands to en-sure economic feasibility	A market demand and feasibility study, sup-ported by a business plan, for specific "green" infrastructure and services has been underta-ken to justify planning and implementation in the industrial park.	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws required park manage-ment entities to prepare the feasibility study and business plan.
57		Park management is financially solvent to op-erate/provide park infrastructure and services	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws required park manage-ment entities to show that they would be able to operate/provide park

					infrastructure and services in a financially solvent manner.
58		The park management should be economical-ly viable in terms of contributing to jobs, tech-nology, and acting as a catalyst to develop-ment of local industry.	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws required park manage-ment entities to show that they would be economically viable as defined in this prere-quisite.
59		Park management entity is responsible for marketing the park and park concepts (EIP concept) to potential national and international investors.	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws required park manage-ment entities to take on this responsibility.

60	A dedicated financial model capturing EIP sa-lient features must be used to set pricing le-vels and anticipated revenues in order to en-hance financial viability of EIP investments.	The park management should render its ser-vices at realistic costs to cover operational expenditures.	[Yes/No]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws required that the plan-ning of the park included the development of the necessary financial model.

PERFORMANCE INDICATORS					
No.	Description/Requirement	Performance Indicator	Unit [Target value]	Categorisation and comments	
61	The EIP provides longer term employment contracts to employees.	Proportion of total firm workers in industrial park employed through direct employment (that is, not employed on a fee-for-output ba-sis or provided through a labor supply firm) and permanent contracts.	Percent em-ployees [30%]		
62	An EIP must look to local suppliers where pos-sible. EIPs provide local businesses with the opportunity to grow.	Proportion of resident firms using local SME suppliers or service providers for at least 25 percent of their total procurement value.	Percent firms [25%]		
63		Proportion of procurement paid to local ser-vice providers within 100 km radius by the park management entity.	Percent total procurement value of park management entity [90%]		

64	An EIP should be "investment ready" so that these parks can offer lower economic risks and better in-vestment opportunities to firms. Essential infrastructure services should be offered by the industrial park, including access to water, energy, roads, and service corridors.	Percentage of space rented or used by resident firms com-pared to the total amount of available space earmarked for resident firms within the park.	Average per-cent occupan-cy rate over 15 years [50%]		In countries where IPs are established by law, it would help implementation of this prere-quisite if these laws required that the parks should show that they are "investment ready" before they are given official approval. For key infrastructure - electricity, water, roads - the park is reliant on those infrastructures being available at "the fence" and ready for hook-up. There is evidence that this is not always the case, or not in the required amounts; this absence will be a barrier to the park's development authorities have not made the external infrastructure available.