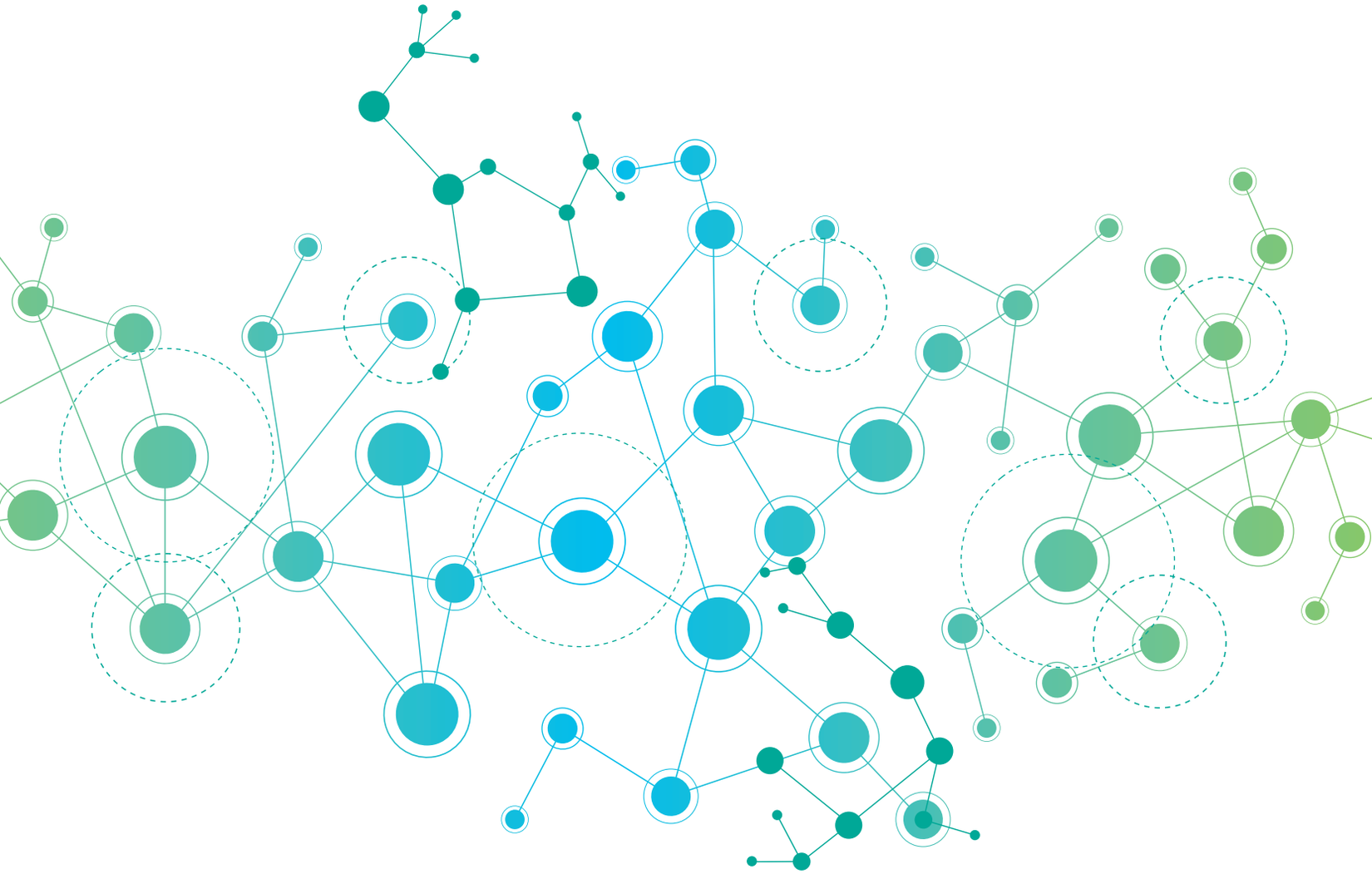
A Practitioner's Handbook For

Eco-Industrial Parks

Implementing the International EIP Framework

Toolbox

March 2019



UNIDO UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

WORLD BANK GROUP

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Ministry of Trade, Industry and Energy

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For Eco-Industrial Parks
Implementing the International EIP Framework

Toolbox

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Tools for implementing the Handbook Section 1: Developing a national approach for eco-industrial parks

Tool 1.1. Stakeholder mapping templates

Stakeholder Mapping Analysis (Stakeholder Mapping Sample 1)

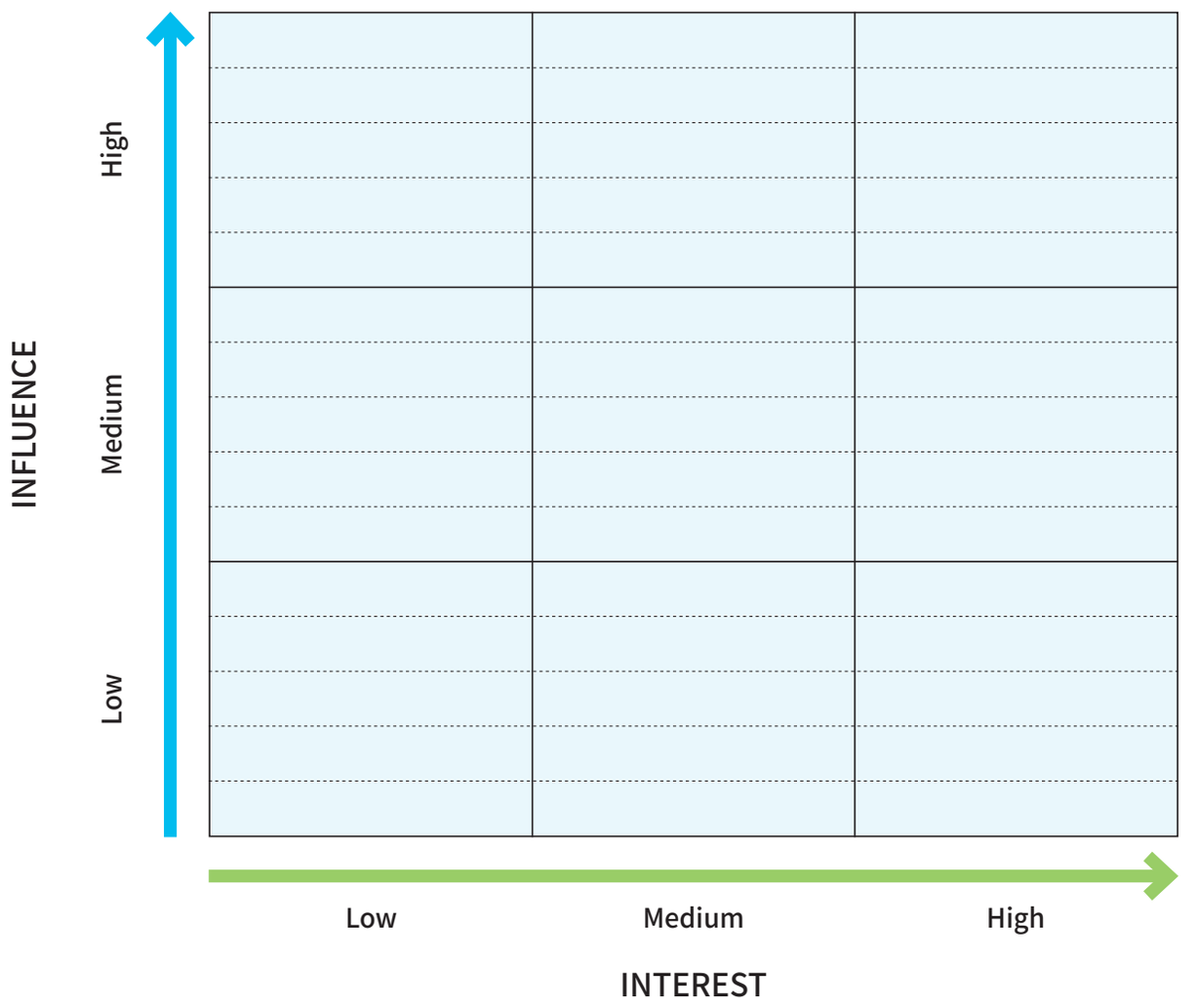
Stakeholder category	Institutions/ organizations (examples)	Roles (examples)	Influence (examples)	Interest (examples)
Government/ policy makers	President's Office Prime Minister's Office	▸ Set high-level policy agenda or national strategies on climate change, sustainability, economic development. ▸ Advise president/ prime minister on a new policy initiative that enables EIP development. ▸ Initiate or facilitate public-private dialogue to develop EIPs.	▸ Have authorities to convene stakeholders relevant to EIP development including the representatives of line ministries. ▸ Manage relations with agencies working on various EIP-related programs and funds.	▸ Align EIP with national policy priorities.
	Ministry of Finance	▸ Introduce relevant policies and regulations on fiscal incentives to promote EIPs ▸ Provide incentives to promote investment in developing EIPs. .	▸ Frame EIP policies in ways that can mobilize public and private investment.	▸ Attract investment in EIPs.
	Ministry of Trade, Industry & Commerce	▸ Develop industrial policies in line with the national EIP framework.	▸ Frame guidelines and directions for sustainable industrial development.	▸ Increase income generation and employment creation by opening up untapped domestic market opportunities for EIP.
	Ministry of Planning	▸ Oversee the design and implementation of the national EIP framework and supporting policy programs.	▸ Help government bodies form a shared vision and ensure the coherency of various policies related to EIP. ▸ Prioritize policy decisions on potential incentive mechanisms to facilitate EIP development.	▸ Incorporate and mainstream EIP into industrial policies. ▸ Develop a national level vision for green growth and sustainable industrial development.

Stakeholder category	Institutions/ organizations (examples)	Roles (examples)	Influence (examples)	Interest (examples)
Government/ policy makers	Ministry of Power/ Energy/Non-conventional energy	▸ Assist government in framing new policies for EIP development and implementation. ▸ Develop energy policies and oversee energy efficiency programs in line with the national EIP framework.	▸ Influence national energy policies that affect the development and operationalization of the national EIP framework.	▸ Help decrease dependence on non-renewable energy sources and improve energy efficiency.
	Investment and Export Promotion Agency	▸ Advocate policy suggestions to government in designing the national EIP framework.	▸ Influence government on national policy and planning issues related to EIP development.	▸ Increase the volume of exports. ▸ Attract investment from foreign investors and financing institutions.
	Ministry of Environment /Ministry of Water& Natural Resources	▸ Assist government in framing new policies for EIP development and implementation. ▸ Support the national taskforce on investment in RECP and EIP.	▸ Frame and develop new regulations to promote energy efficiency/RECP practices. ▸ Introduce new environmental policies that can influence industrial production processes.	▸ Promote and facilitate investment in environmentally sound/ resource-efficient technologies and industrial processes.
Implementing agency/staffs	Park developer or park operator (sometimes also zone authority)	▸ Promote EIPs as a differentiator to attract investment/FDI in industrial parks. ▸ Assist and conduct technical analyses, and support data collection and decision-making processes. ▸ Lead and participate in the development of new EIP programs or update the park's existing policies and programs related to EIP. Ensure their implementation. ▸ Facilitate the collaboration between national, local governments in EIP transition processes. ▸ Use EIP performance monitoring system to build market profile at the park level and identify opportunities to improve its competitiveness accordingly.	▸ Influence government on national policy and planning issues related to EIP development.	▸ Attract investment in the zones and industrial parks from foreign investors and financing institutions.

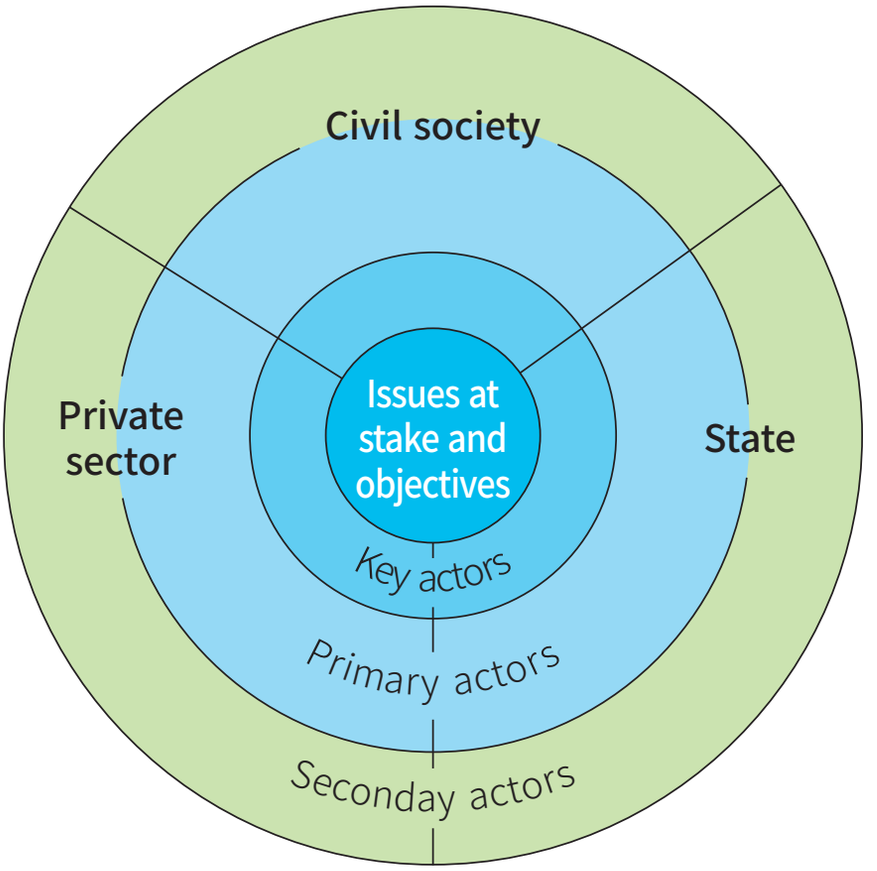
Stakeholder category	Institutions/ organizations (examples)	Roles (examples)	Influence (examples)	Interest (examples)
Investors	Foreign and local investors (both equity and debt capital investors)	▸ Support investment decisions in upgrading existing industrial parks or in developing new EIPs. ▸ Develop and promote financial incentives to implement EIPs and other relevant policies.	▸ Identify sustainable investment opportunities. ▸ Present the perspectives of financial sector entities regarding financing EIP development.	▸ Achieve attractive returns on investment.
Resident firms	SMEs, industrial suppliers	▸ Participate in EIP programs, activities and demonstration projects. ▸ Collect and provide data for the park operator/ management entity.	▸ Provide industry's perspectives and input for the design and implementation of EIP policy and framework.	▸ Generate their market values. ▸ Increase reputation among their shareholders and consumers.
Business Associations /Chamber of Commerce	Chamber of Commerce, Trade/Industry Associations, Manufacturers' associations, SME associations, etc.	▸ Coordinate partnership between resident firms and local governments and provide support for identifying potential EIP opportunities.	▸ Present the views of the private sector entities along the policy-making processes to promote EIPs.	▸ Influence EIP policies to make sure that economic and financial interests of their members are met.
Service providers	Water/ Electricity suppliers, other EIP technology suppliers	▸ Share knowledge and necessary data to meet increasing demand for improved energy efficiency ▸ Ensure that new EIP infrastructures and services are resilient to higher resource costs and various climate change risks.	▸ Provide collective services and technologies essential to realizing EIP development.	▸ Generate market values and new business opportunities.
Employees	Employees' Associations	▸ Promote local jobs related to EIP businesses by raising awareness on the benefits of EIP initiatives.	▸ Facilitate linkages between resident firms, SMEs and communities inside and outside the park.	▸ Promote sustainable working environment for employees within the industrial park.
Customers of resident firms	Industrial/ commercial buyers including the global buyers	▸ Develop corporate sustainability standards or standards for eco-friendly products.	▸ Influence resident firms to go beyond their conventional production practices toward developing eco-friendly products.	▸ Gain reputation as a sustainable company, thereby increasing their market values.

Stakeholder category	Institutions/ organizations (examples)	Roles (examples)	Influence (examples)	Interest (examples)
Development partners (external)/ International organizations	World Bank, IFC, UNIDO, GIZ, DFID, and other development partners	▸ Provide customized support to EIP policy processes, building upon the lessons learned globally. ▸ Help line ministries and key stakeholders translate the International EIP Framework into the national EIP framework through technical and regulatory assessment. ▸ Share international best practices and develop capacity building programs.	▸ Form national and local partnerships to increase investments in EIPs.	▸ Promote sustainable socio-economic development and private sector development of their client countries.
Civil society	NGOs	▸ Support EIP programs to improve resident firms' environmental and social performance. ▸ Encourage resident firms to meet EIP commitments at the global, national and/or local levels. ▸ Participate in dialogues and EIP policy-making processes.	▸ Communicate to government about the need to modify the national EIP framework including the target values of the EIP performance indicators. ▸ Influence resident firms to go beyond their conventional production practices.	▸ Promote sustainable livelihoods and development opportunities within the country.
	Academia and Research institutions	▸ Support improved access to technology, R&D and skills related to EIP, especially through capacity building processes. ▸ Develop (inter)national best practice case studies on EIP-related policies.	▸ Generate new knowledge and technologies useful to implementing the national EIP framework. ▸ Scope and develop the best available technologies that can be applicable to EIPs.	▸ Increase investment in research that helps advance EIP technologies.
	Local communities	▸ Provide views of local communities on EIP development. ▸ Provide support for infrastructure development and provision of services through consent.	▸ Communicate with government about impact of EIPs on the local population.	▸ Promote sustainable livelihoods and development opportunities for local people.

Stakeholder Mapping Matrix (Stakeholder Mapping Sample 2)



Stakeholder Mapping Diagram (Stakeholder Mapping Sample 3)



Tool 1.2. A checklist of questionnaires for stakeholder analysis

Category	Objective of analysis	Sample questionnaires
Institutional & organizational capacity	Understand policy making processes relevant to EIP, as well as the legitimacy and coordination capacity of institutions involved.	▸ Is there a significant lack of coordination among stakeholders, which could impede the operation of EIP projects? ▸ Is there general lack of trust in key public/private sector institutions?
	Review institutional support and stakeholders' capacities to conduct public-private dialogue (PPD).	▸ Is there general support for EIPs? ▸ Are there any existing successful dialogue initiatives or processes on relevant topics (e.g. industrial competitiveness, climate change, and clean production) that can be leveraged? ▸ Are stakeholders experienced in making evidence-based policy decisions? ▸ Do private sector stakeholders have capacities to contribute to the design and implementation of EIPs? ▸ How do relevant public institutions coordinate with each other? Do institutions have overlapping mandates regarding the development of EIP projects? ▸ Are there feedback loop mechanisms? ▸ Are there relevant and credible research institutions that can participate in the PPD? ▸ Which are the institutions that have capacity and credibility to support and lead EIP-related dialogues? ▸ What are the financial mechanisms that can help fund PPD activities? ▸ Which existing dialogues can be anchored to initiate a PPD on EIP? ▸ Which institutions are supportive of EIP agenda? ▸ Who has a mandate or ability to convene stakeholders? ▸ Do any key groups lack in terms of capacity to participate in EIP-related PPD?
	Examine perceptions and awareness on EIP.	▸ Are the high-level objectives and benefits clear to stakeholders? ▸ Are there any knowledge gaps? If so, what are they? ▸ What perceptions do stakeholders have of EIP and each other within the scope of EIP design and implementation? ▸ Are stakeholders adequately sensitized and aware of the objectives of EIPs? ▸ Is information/knowledge equally accessible to all stakeholders? Where are the knowledge gaps? What would be potential strategies to close the knowledge gaps regarding EIP?

Category	Objective of analysis	Sample questionnaires
Political economy of EIP development	Understand political economy and power dynamics that could affect EIP development processes.	▸ How complex and challenging is the political economy? What is the track record of reforms in the past? ▸ What is the level of the private sector's influence on policy decisions in general? ▸ What does the ecosystem of identified EIP stakeholders look like? Are there centers of power/influence/networks? ▸ Who are the potential champions, allies and adversaries that can help achieve or hinder the implementation of EIPs? Is there a risk of agenda capture?
Inclusiveness of EIP development process	Ensure the inclusiveness of decision-making processes by engaging all affected parties, citizens and beneficiaries.	▸ Are all beneficiaries being consulted or engaged? ▸ Are there any stakeholders who are marginalized but should have been involved? ▸ Are there any on-going or planned industrial park projects that need to work with adjacent communities on skills development, employability, resettlement, and environmental issues etc.? ▸ Where and how do stakeholders/beneficiaries get their information/ news? ▸ Is information/knowledge equally accessible to all stakeholders?

Tool 1.3. A checklist for a national-level "snapshot" technical analysis

	Topic	Sub-topic	Questions to assess the readiness of industrial parks for implementing the International EIP Framework	
Park management	Park management services	Park management	▸ Does a distinctive park operating body (or alternative agency) exist to handle park planning, operations and management, and monitoring?	
		Park property, common infrastructure and services	▸ Does the park operator/park management entity manage and maintain the industrial park property, common infrastructure, and services as prescribed in the tenant contract and the park's Master Plan?	
	Monitoring and risk management	Monitoring EIP performance and critical risk management	▸ Does the park management entity maintain a monitoring system that can be used in tracking the progress on environmental, social and economic performance at the park level?	
			▸ Does the park management entity have a plane to respond to possible negative impacts due to climate change risks (heat waves and droughts, storms and floodwater events)?	
			▸ Does the park management entity examine critical risk/hazard factors and plan related responses for handling hazardous materials, liquid and gaseous effluents, including transportation and disposal of those substances?	
			▸ Does the park management entity have a risk management plan in place to deal with the adverse impacts of climate change and extreme weather events (e.g. heat waves, droughts, storms, flashflood)? Are the adaptation opportunities for infrastructure and services identified?	
		Information on applicable regulations and standards	▸ Does the park management entity have a functioning system that enables park to comply with local and national regulations, and international standards applicable to the industrial park?	

	Checklist	If the answers to these questions are yes, collect the following information during a snapshot technical assessment (If answers are no, implement a range of corrective actions suggested in Tool 2.4 to ensure that prerequisites are met.)
	Y/N	If yes, collect information about the roles and responsibilities of the park operating body.
	Y/N	If yes, review whether the park operator or park management entity performs the following functions: ▸ Property management, including plot allotments, re-allotments, development, land use monitoring, and so on. ▸ Utilities, roads, and technical units such as waste and wastewater treatment plants and operations, power and energy systems. ▸ Waste collection areas and services. ▸ Maintenance and repair workshops. ▸ Common landscaping, buffer zones, street lighting, security surveillance and street cleaning. ▸ Security and emergency response services and facilities. ▸ Common employee and tenant facilities. ▸ Provide facilitating services to and between resident firms (for example, networking, collaboration and training opportunities). ▸ Engagement with the park's stakeholders and business representatives.
	Y/N	See Step 4.1 of Section 1 in the Handbook.
	Y/N	If yes, collect necessary quantitative and qualitative data following Step 4.1 of Section 1 and prepare consolidated reports.
	Y/N	If yes, list the park operator's plans to handle hazardous materials within the selected industrial parks. This information will be useful in setting up the target value related to the performance indicator on Air, GHG emissions and pollution prevention.
	Y/N	If yes, review and collect information on the strategies and plans to handle climate change risks within industrial parks.
	Y/N	If yes, collect information on the list of local and national regulations relevant to promoting EIP (see Tool 1.5).

	Topic	Sub-topic	Questions used for assessing the readiness of industrial parks to apply the International EIP framework
Park management	Planning and zoning	Master Plan	▸ Has a Master Plan (or a planning document that is equivalent to the Master Plan) been developed for industrial parks? ▸ Is it reviewed regularly? ▸ And, does the Master Plan include the following: ▹ Site selection study based on various risk analyses including seismic risk assessment; ▹ Essential and efficient infrastructure, utilities and transportation network; ▹ Environmental and social impact assessment; ▹ Internal park land zoning; ▹ Buffer zone around the park; ▹ Procedure to safely locate high risk industries; ▹ Plans to locate and cluster synergistic industries. ▸ Does the Master Plan integrate elements elaborated in the International EIP Performance requirements?
Environmental	Management and monitoring	Environmental/ Energy Management Systems (EMS and EnMS)	▸ Do park management entities operate an environmental/energy management system in line with internationally certified standards (e.g. ISO 14001, ISO 50001), monitoring park performance and supporting resident firms?
	Energy	Exchange of waste heat energy	▸ Are the industrial heat recovery strategies in place to identify opportunities for heat and energy recovery for the major energy-consuming firms in the park? (typically, those that consume at least 10-20 percent of total energy consumed at the park)
		Energy efficiency	▸ Do the energy efficiency measures exist for the park management infrastructure and major energy consuming resident firms?
	Water	Water efficiency, reuse and recycling	▸ Do parks and resident firms have plans and documented evidence to increase water reuse in the short and medium term? The plans could be related to reuse of industrial effluents and rainwater/storm water collection.
	Climate change and the natural environment	Air, GHG emissions and pollution prevention	▸ Is a program established to monitor, mitigate and/or minimize GHG emissions, such as carbon dioxide, methane, nitrogen, and so on?
			▸ Is there clear evidence of steps taken into introduce mitigation activities at the park level?
		Environmental assessment and ecosystem services	▸ Does the park management entity have a plan in place to assess operational environmental impacts and aims to reduce the environmental impact on prioritized local ecosystem services?
Social	Social management systems	Management team	▸ Does the park management entity have dedicated personnel to plan and manage social quality standards?

	Checklist	If the answers to these questions are yes, collect the following information during a snapshot technical assessment (If answers are no, implement a range of corrective actions suggested in Tool 2.4 to ensure that prerequisites are met.)
	Y/N	If yes, collect further information on: ▸ Master Plans for industrial parks ▸ Site selection studies ▸ Environmental and Social Impact Assessment studies ▸ Regulations related to planning and siting industrial parks
	Y/N	If yes, examine how many large resident firms (with more than 250 employees) have environmental/energy management systems tin line with internationally certified standards.
	Y/N	If yes, list industrial heat recovery strategies in place. This will be helpful in identifying opportunities to create industrial symbiosis network. Use Table 6 of the Handbook as a reference.
	Y/N	If yes, collect data on the types of energy efficiency measures for the park management infrastructure. This will provide useful information in setting the target value of the performance indicator related to energy consumption and energy efficiency categories.
	Y/N	If yes, review park level plans, programs, or documents, as well as the firm level water saving and reuse plans, to improve water reuse and reduce water consumption. This review will provide helpful information in setting the target values of the performance indicators related to water efficiency, reuse and recycling.
	Y/N	If yes, collect information on the list of measures and programs introduced within the industrial parks and/or by major polluters to reduce GHG emissions (e.g. low-carbon technologies, energy efficiency measures, waste heat). This information will help set the target values of the performance indicators on Air, GHG emissions and pollution prevention.
	Y/N	
	Y/N	If yes, identify and assess the operational environmental impacts.
	Y/N	If yes, collect data via survey if dedicated personal exist to plan and manage social quality standards.

	Topic	Sub-topic	Questions used for assessing the readiness of industrial parks to apply the International EIP framework
Economic	Social infrastructure	Primary social infrastructure	▸ Is social infrastructure included in the site master plan and fully operational?
	Employment generation	Type of employment	▸ Does the park management entity have plans to generate specific number and type of jobs in line with the national government targets? ▸ Do industrial parks generate employment opportunities for local communities?
	Local business and SME promotion	SME development	▸ Does the park management entity promote the establishment of SMEs that add value to the resident firms in the industrial parks?
	Economic value creation	Market demand for EIP services and infrastructure	▸ Does the industrial park fulfil the relevant government targets, including domestic, FDI and tax revenues? ▸ Does the park management entity track the economic performance of the industrial parks? ▸ Are market demand and feasibility studies developed for green infrastructure and service offerings?

	Checklist	If the answers to these questions are yes, collect the following information during a snapshot technical assessment (If answers are no, implement a range of corrective actions suggested in Tool 2.4 to ensure that prerequisites are met.)
	Y/N	If yes, identify via the site master plan if essential primary social infrastructure has been adequately provided and is fully operational.
	Y/N	If yes, collect information on park operator's plans to generate specific numbers and types of jobs in line with government targets. Collect data via survey on historical employment data if industrial parks generate employment opportunities for local communities.
	Y/N	If yes, identify programs aimed at promoting SMEs. Assess the total procurement values of the park operator supplied by local firms and SMEs under these programs. This assessment will help set the target values of the economic performance indicators.
	Y/N	If yes, identify market demands and feasibility studies for green infrastructure and services.

Tool 1.4. List of EIP performance indicators and steps involved in establishing target values (full list)

	Topic	Sub-topic	Indicator	Unit	Information required to set targets	
Park management	Park management services	Park management empowerment	Proportion of firms in the industrial park that 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[1]; 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.	Percentage of firms (%)	Documentation related to industrial park management and tenant membership; local norms and regulation regarding park management, and tenant contracts.	
		Park management entity property and common infrastructure	The resident firms are satisfied with the provision of services and common infrastructure by the park management's entity (or alternative agency, where applicable).	Percentage of firms (%)	Industrial park statistics collected by the park operators.	
	Monitoring and risk management	EIP performance and critical risk management	Park management entity regularly monitors and prepares consolidated reports regarding the achievement of target values as documented in the International EIP Framework to encompass the following; ▸ Environmental performance; ▸ Social performance; ▸ Economic performance; ▸ Critical risk management at the level of the park.	Frequency of reports	Report provided by the park operators on risk management and emergency responses.	

1 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 operator with the necessary powers.

2 In some cases, negotiations among stakeholders may be required to set target values for EIP performance indicators.

	Steps involved in setting the indicators/ Where and how to obtain information	Potential stakeholders to consult	Setting the target values (minimum, medium, and maximum)	What needs to be done if the info is not readily available, or if there is no relevant regulation
	▸ Assess legally binding documentation between the park entity and tenants (for example, rental contracts at pilot parks) and park governance regulations at the national level.	Park operators, zone authority	Work with park operators[2)]	▸ Perform surveys to check park governance and resident membership contracts. Work with park operators to set the target value.
	▸ Assess data provided by park operators regarding firm satisfaction.	Park operators, zone authority	Work with park operators.	▸ Perform surveys to assess firms' satisfaction with social infrastructures provided by park operators. ▸ Work with park operators to set the target value.
	▸ Check whether the reporting requirement is based on the appropriate set of information. ▸ Check whether park operators have a system to ensure the quality of information and data collected for monitoring EIP performance. ▸ Check the current reporting frequency (e.g. 6 months, 12 months).	Park operators, zone authority	Work with park operators.	▸ Work with park operators to set up a reporting management system in line with EIP performance indicators. ▸ Work with park operators to set the target value.

	Topic	Sub-topic	Indicator	Unit	Information required to set the targets
Environmental	Management and monitoring	Environmental/ Energy Management Systems (EMS and EnMS, respectively)	Proportion of resident firms, with more than 250 employees, which have an environmental/energy management system in place that is in line with internationally certified standards.	Percentage of firms	Annual national statistics on firms, statistics published by the park operator/park management entity (in pilot parks).
	Energy	Energy consumption	Proportion of combined park facilities and firm-level energy consumption, for which metering and monitoring systems are in place.	Percentage of combined park & firm level energy consumption (%)	Annual national statistics on the firm-level energy consumption.
		Renewable and clean energy	Total renewable energy use in the industrial park is equal to or greater than the annual national average energy mix.	Percentage of renewable energy use in park relative to national average (%)	Annual national average energy mix data, information about the installed capacity of renewable energy generators within the park.
			Park management entity sets and works toward ambitious (beyond industry norms) maximum carbon intensity targets (maximum kilograms of carbon dioxide equivalent (kgCO2e)/ kilowatt hour (kWh) for the park and its residents. Targets should be established for the short, medium, and long term.	Kg CO2e/kWh [in line with local norms and industry sector benchmarks]	Information on national best practice within industry sectors that have significantly reduced carbon intensity. Use sandbox or similar tools provided by international development banks to calculate carbon intensity index.
		Energy Efficiency	Park management entity sets and works toward ambitious maximum energy intensity targets per production unit (kWh/$ turnover) for the park and its residents. Targets should be established for the short, medium, and long term.	kWh/$ turnover [in line with local norms and industry sector benchmarks]	National GDP (annual), total annual electricity consumption.

	Steps involved in setting the indicators/ Where and how to obtain information	Potential stakeholders to consult	Setting the target values (minimum medium, and maximum)	What needs to be done if the information is not readily available, or if there is no relevant regulation
	▸ Check with management firms that provide certification to identify firms that have EMS systems in place and hire more than 250 employees. Assess the national landscape of the firms with EMS/EnMS systems.	Ministry of Environment, Ministry of Industrial Development, Certification institutions, and the representatives of the firms	>= national average	▸ Run a survey of selected industrial parks to examine whether resident firms with more than 250 employees have EMS in place in line with international standards ▸ Work with park operators to set a reasonable target value.
	▸ Request data from utilities (public and private) that provide power supply to industrial parks.	Utility companies, park operators	Maximum value/set as highest as possible	▸ Identify reasons why no metering systems are installed and use preliminary results available from the local utilities' current billing systems.
	▸ Examine annual national average energy mix. ▸ Examine installed capacity of renewable energy plants within selected industrial parks. ▸ Compare the park's renewable energy installation capacity against the national energy mix.	Representatives of stakeholder groups including park operators, electricity providers to the park, ministries of energy and industrial development which grant licenses or permits to operate renewable plants	Work with park operators.	If there is no regulation that requires a certain level of renewable energy mix, or if there is no data collected on the national renewable energy mix: ▸ Identify a benchmark in the region or around the world that promotes renewable energy use/production in the industrial parks. ▸ Compare this benchmark with available national data. ▸ Provide support for industrial park entities to help them agree on targets that go beyond the national average mix.
	▸ Set the benchmark by identifying international/regional best practices that align with national policy goals. ▸ Involve the main industrial park entities in roundtables to identify feasible targets beyond national industry sector benchmarks.	Ministry of Industrial Development, Ministry of Environment, park management entities	Work with park operators.	▸ Establish a system to identify national benchmarks by sectors, using tools and information provided by international development banks. ▸ At the national level, collect data across industrial parks for 1 or 2 years. ▸ Talk to industrial park entities to agree on targets beyond national benchmarks.
	▸ Set the target by industry sector by calculating: ▸ Total annual electricity consumption (kWh)/The national GDP generated by the industry sector annually	Ministry of Industrial Development, Ministry of Finance, Ministry of Environment, park management entities	Work with park operators.	▸ Establish a system at the national level to collect data across industrial parks for 1 or 2 years. ▸ Identify national benchmarks by sectors, using tools and information provided by international development banks. ▸ Talk to industrial park entities to agree on targets beyond national benchmarks.

	Topic	Sub-topic	Indicator	Unit	Information required to set the targets
Environmental	Water	Water consumption	Total water demand from firms in industrial park which do not have significant negative impacts on local water sources or local communities.	Percentage of water demand (%)	Availability of water resources and valuation of consumption rate to avoid depletion.
		Water treatment	Proportion of industrial wastewater generated by industrial park and resident firms, which is treated to appropriate environmental standards.	Percentage of waste water treated/total waste water (%)	Quality of water from national lakes, rivers, sea, and groundwater in proximity of industrial parks.
		Water efficiency, reuse and recycling	Proportion of total industrial wastewater from firms in the park are reused responsibly within or outside the industrial park.	Percentage of water reused/ total water consumed (%)	National statistics data on the total amount of industrial water consumption; Total amount of treated wastewater by industrial sectors.
	Waste and material use	Waste/by-product re-use and recycling	Proportion of solid waste generated by firms, which is reused by other firms, neighboring communities, or municipalities.	Percentage of solid waste reused/total waste (%)	Data on national waste management with a focus on landfill, recycling and incineration capacities.
	Waste and material use	Dangerous and toxic materials	Proportion of firms in park, which appropriately handle, store, transport and dispose of toxic and hazardous materials.	Percentage of firms (%)	Information on the regulatory framework on toxic waste management.
		Waste disposal	Maximum proportion of wastes generated by firms in the industrial park which go to landfills.	Percentage of waste to landfill (%)	Data on national waste management with a focus on landfill, recycling and incineration capacities

	Steps involved in setting the indicators/ Where and how to obtain information	Potential stakeholders to consult	Setting the target values (minimum medium, and maximum)	What needs to be done if the information is not readily available, or if there is no relevant regulation
	▸ Analyze national data on water resources and consumptions. ▸ Examine national statistics on water shortage induced by weather conditions including extreme weather events.	Ministry of Environment, Ministry of Industrial Development, government entities helping to protect rivers, lakes and groundwater sources, park operators	Work with park operators.	▸ Assess the amount of water resource extracted from rivers and groundwater sources. ▸ Examine whether the water resource is consumed at a sustainable level. ▸ Identify global or regional benchmark on industrial sectors' sustainable water consumption levels and practices. ▸ Work with park operators to set the target value.
	▸ Check regulatory documents to see whether resident firms are required to treat wastewater by law.	Ministry of Environment, Ministry of Industrial Development, government entities helping to protect rivers, lakes and groundwater sources, park operators	Work with park operators.	▸ Map water systems near industrial parks. ▸ Analyze the quality of water from national lakes, rivers, sea, and groundwater in proximity of industrial parks. ▸ Convene the Ministry of Environment and park operators to set the target value.
	▸ Examine existing rules or regulatory frameworks that oversee industrial water consumption with an aim to minimize inefficient use of water in industrial processes.	Ministry of Environment, Ministry of Industrial Development, national agency for the protection of rivers, lakes and groundwater sources, park operators	Work with park operators.	▸ Identify national water resources and maximum consumption rate to avoid depletion. Provide support to incentivize wastewater treatment activities and the reuse of refined water. ▸ Work with park operators to set the target value.
	▸ Examine national targets, regulations and local norms on waste management.	Ministry of Environment, Ministry of Industrial Development, and park operators	Work with park operators.	▸ Map national landfill, incineration and recycling capacity. ▸ Set medium- to long-term plans to incentivize recycling over landfill and incineration. ▸ Work with park operators to set the target value.
	▸ Examine how toxic materials and hazardous substances are defined within countries' existing regulatory framework.	Ministry of Environment if necessary	Maximize target value.	▸ Refer to the international or regional best practices to update hazardous and toxic waste list. ▸ Work with park operators to set the target value.
	▸ Examine national targets, regulations and local norms on waste management.	Ministry of Environment, Ministry of Industrial Development, and park operators	Work with park operators.	▸ Map national landfill incineration, and recycling capacity. ▸ Set medium- to long-term plans to incentivize recycling over landfill and incineration. ▸ Work with park operators to set the target value.

	Topic	Sub-topic	Indicator	Unit	Information required to set the targets
Environmental	Climate change and the natural environment	Flora and fauna	Minimum proportion of open space in the park used for native flora and fauna.	Percentage of open space (%)	National norms about urban or industrial development and minimum regulatory requirements for green space.
		Air, GHG emissions and pollution prevention	Proportion of firms in park which have pollution prevention and emission reduction strategies to reduce the intensity and mass flow of pollution/ emission release beyond national regulations.	Percentage of firms (%)	National environmental laws and regulations on emissions; regional and international best practices on emission targets.
			Proportion of largest polluters in industrial park which have a risk management framework in place that: (a) identifies the aspects which have an impact on the environment and; (b) assign a level of significance to each environmental aspect.	Percentage of largest emitters (%)	Records of environmental violations or documented information on the past historical environmental accidents.
Social	Social management systems	OH&S management system	Percentage of all firms in the industrial park with more than 250 employees that have a well-functioning OH&S management system in place.	Percentage of firms (%)	National statistics; industrial park statistics; data on industrial parks from major certification bodies.

	Steps involved in setting the indicators/ Where and how to obtain information	Potential stakeholders to consult	Setting the target values (minimum medium, and maximum)	What needs to be done if the information is not readily available, or if there is no relevant regulation
	▸ Check the site plans, design, and layout of industrial parks. ▸ Conduct a physical assessment of green space set aside in the site plans.	Ministry of Forestry, Fishery and Agriculture, Ministry of Industrial Development, and park operators.	Minimum acceptable value	▸ Check the site plans, design, and layout of industrial parks. ▸ Conduct the assessment of green spaces available on sites. ▸ Work with park operators to set the target value.
	▸ Check the existing national targets to reduce the list of pollutants and GHGs including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), sulfur oxides (SOx), and nitrogen oxide (NOx) emissions. ▸ Check countries' mid-term targets to reduce the emission of the list of afore-mentioned pollutants. ▸ Conduct a survey of selected industrial parks to set a benchmark for the target value.	Ministry of Environment, Ministry of Industrial Development, and park operators	Work with park operators.	▸ dentify international/regional best practices in setting up mid-term targets to reduce the emission of the listed pollutants. ▸ Conduct a scenario analysis. ▸ Work with park operators to set the target values.
	▸ If the regulation exists on risk management (hazardous material management and safety regulations, etc.), all resident firms within the park must comply with these regulations.	Ministry of Environment, relevant line ministries, and park operators	Work with park operators.	▸ dentify large emitters in terms of the level of their CO_2, CH_4, N_2O, CFCs, HFCs, SOx, and NOx emissions. ▸ Check the records of large emitters' environmental violations or incidents of non-compliance. ▸ Work with park operators to set targets or limits regarding the acceptable number of accidents by large emitters.
	▸ Analyze national and park statistics or assess data available from certification bodies.	Certification bodies, Ministry of Labor, and park operators	Work with park operators.	▸ Assess annual data on injuries, occupational diseases, absenteeism, as well as the total number of work-related fatalities by industrial sector. ▸ Conduct a survey among the resident firms with more than 250 employees within parks to examine whether they have an OH&S management system in place. ▸ Work with park operators to set the target value.

	Topic	Sub-topic	Indicator	Unit	Information required to set the targets	
Social	Social management systems	Grievance management	Percentage of grievances received by the park management entity which are addressed within 90 days.	Percentage of grievances (%)	Industrial park statistics and records on non-compliance management (quality management system) over a six-month period.	
			Percentage of grievances received by the park management entity, which were brought to conclusion.	Percentage of grievances	Industrial park statistics and non-conformity management (quality management system).	
			Percentage of all firms in the industrial park with more than 250 employees that have a code of conduct system in place to deal with grievances.	Percentage of firms	Industrial park statistics and reports on the status of non-conformity management (quality management system).	
		Harassment response	Percentage of all firms in the industrial park with more than 250 employees that have a harassment prevention and response system in place.	Percentage of firms	Industrial park statistics and reports on harassment prevention and management.	
	Social infrastructure	Primary social infrastructure	Percentage of the surveyed employees' reporting satisfaction with social infrastructure.	Percentage of surveyed employees	Industrial park statistics and reports.	
	Social infrastructure	Industrial park security	Percentage of reported security and safety issues that are adequately addressed within 30 days.	Percentage of reported security and safety issues	Industrial park statistics and reports on security and safety records.	

3 IFC published a guideline on grievance management for companies doing businesses in emerging markets. Further information can be found in the following link: https://www.ifc.org/wps/wcm/connect/4d94aa80488559ed849cd66a6515bb18/PartOne_GrievanceManagement.pdf?MOD=AJPERES

	Steps involved in setting the indicators/ Where and how to obtain information	Potential stakeholders to consult	Setting the target values (minimum medium, and maximum)	What needs to be done if the information is not readily available, or if there is no relevant regulation
	▸ Assess data provided by park operators on grievance statistics and management.	Park operators	Work with park operators.	▸ Conduct surveys at the park level to assess the current status of grievance management. ▸ Benchmark international best practices.[3] ▸ Work with park operators to set target value.
	▸ Assess data provided by park operators on grievance statistics and management.	Park operators	Work with park operators.	▸ Conduct surveys at park level to assess the current status of grievance management. ▸ Work with park operators to set the target value.
	▸ Assess data provided by park operators on grievance statistics and management.	Park operators	Work with park operators.	▸ Conduct surveys at park level to assess the current status of grievance management. ▸ Work with park operators to set the target value.
	▸ Assess data provided by park operators on harassment statistics and management.	Park operators	Work with park operators.	▸ Conduct surveys at park level to assess the current status of harassment and strategies to manage harassment. ▸ Work with park operators/park management entities to set the target value.
	▸ Assess data provided by park operators on the level of employees' satisfaction.	Park operators, Ministry of Equality or Social welfare	Work with park operators.	▸ Conduct surveys at park level to assess employees' satisfaction with social infrastructure provided by park operators. ▸ Work with park operators to set target value.
	▸ Assess data provided by park operators on safety and security issue management.	Park operators	Work with park operators.	▸ Conduct surveys at park level to assess safety and security issue management. ▸ Work with park operators to set the target value.

	Topic	Sub-topic	Indicator	Unit	Information required to set the targets
Social	Social infrastructure	Capacity building	Percentage of all firms in the industrial park with more than 250 employees with a program for skills/vocational training and development.	Percentage of firms	Industrial park statistics, reports and other records on vocational training.
			Percentage of female workforce who benefit from available supporting infrastructure or programs for skills development.	Percentage of female workforce	Industrial park statistics and reports.
	Local community outreach	Community dialogue	Percentage of the surveyed community members that are satisfied with the community dialogue.	Percentage of surveyed community members	Survey data conducted by park operators or park management entities with local communities in the region; Communication & marketing plans or strategies implemented by the national or regional park management entities.
		Community outreach	Number of outreach activities implemented by the park management entity annually that are regarded as positive by over 80 percent of the surveyed community members.	Number of outreach activities per year	Survey data conducted by park operators/park management entities with local communities in the region; Communication & marketing plans or strategies implemented by the national or regional park management entities
Economic	Employment generation	Local employment generation	Percentage of total workers employed in industrial park who live within daily commuting distance.	Percentage of employees	National statistics on the national average commuting distance to work; industrial park-level or firm-level statistics on employees' commuting distance, commuting modes and time, and where they are commuting from.

	Steps involved in setting the indicators/ Where and how to obtain information	Potential stakeholders to consult	Setting the target values (minimum medium, and maximum)	What needs to be done if the information is not readily available, or if there is no relevant regulation
	▸ Assess data provided by park operators on their programs and resident firms' programs for employees' skills/ vocational training and development.	Park operators	Work with park operators.	▸ Conduct surveys at park level and with resident firms to examine existing programs for skills/vocational training and development. ▸ Work with park operators to set target the value.
	▸ Assess data provided by park operators on infrastructure or programs for skill development grouped by gender.	Park operators	Work with park operators.	▸ Conduct surveys at park level to assess infrastructure or programs for skills development and gender statistics; ▸ Identify international best practices and benchmark; ▸ Work with park operators to set the target value.
	▸ Analyze data that park operators collect from local communities or those who live within a close proximity to industrial parks. ▸ Assess communication and marketing plans provided by main industrial parks	Local communities living in close proximity to industrial parks.	Work with park operators.	▸ Conduct surveys with local communities within a reasonable radius from the industrial parks to assess their satisfaction with parks' efforts to inform and engage communities on the matters that affect them.
	▸ Analyze data that park operators collect from local communities on their satisfaction with park's efforts to inform and engage them in the matters that affect them. ▸ Assess communication and marketing plans provided by park operators.	Local communities within a reasonable radius from the industrial parks, local municipalities, and park operators.	Work with park operators.	▸ Conduct surveys with local communities within a reasonable radius from the industrial parks to assess their satisfaction with parks' efforts to inform and engage communities on the matters that affect them.
	▸ Check with national level park management entity on the availability of data on the average commuting distance to work. ▸ Check whether information on employees' commuting distance is available at the park level or firm level.	Ministry of Labor and park operators	Work with park operators.	▸ In partnership with park operators and the representatives of resident firms, conduct surveys of workers in the industrial parks to assess the actual percentage of workers who live within daily commuting distance. Use appropriate sampling techniques.

	Topic	Sub-topic	Indicator	Unit	Information required to set the targets	
Economic	Employment generation	Type of employment	Percentage 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.	Percentage of employees	National and provincial-level statistics on employment (e.g. employment rate); industrial park-level targets and statistics on employment.	
	Local business and SME promotion	Local value added	Percentage of resident firms using local suppliers or service providers for at least 80 percent of their total procurement value.	Percentage of firms	Industrial park statistics on resident firms' procurement strategies, as well as reports on strategies to engage local suppliers or service providers; and similar statistics and reports available at the national level.	
			Percentage of total procurement value of park management entity supplied by local firms or service providers.	Percentage of total procurement value of park management entity or park operator		
	Economic value creation	Investment-ready park for firms	The ratio of rented or used space by resident firms compared to the total amount of available space earmarked for resident firms within the industrial parks.	Average percent occupancy rate over 5 years	Documentation or data collected by the park operator on the status of resident firms' rental contracts.	

	Steps involved in setting the indicators/ Where and how to obtain information	Potential stakeholders to consult	Setting the target values (minimum medium, and maximum)	What needs to be done if the information is not readily available, or if there is no relevant regulation
	▸ Examine reports, statistics, documentation and targets set both at the national and local levels that are relevant to increasing direct employment. ▸ Check with park operator's long-term strategies to meet market demands, as well as strategies to increase profitability. ▸ Check with park operators the selection criteria the resident firms in the park adopt for employment and conduct a gap analysis of skills and competences in the region.	Ministry of Industry, Ministry of Labor and park operators	Work with park operators.	▸ Assess and forecast the long-term growth rate of industrial sectors within the industrial parks. ▸ Verify with park operators and the Ministry of Labor on the direct employment rate. ▸ Identify a program or areas for intervention to support technical education and better meet with the needs of the industrial park. ▸ Work with park operators to develop medium- and long-term plans to increase employment of local workers with proper skills and competences. Ensure that these plans are in line with the park's expectations on the medium- and long-term growth of the sectors within the park.
	▸ Analyze region's industrial activities and available services that are relevant to selected industrial parks' specialized/priority sectors and procurement strategies. ▸ Analyze outsourcing or procurement strategies of the industrial parks. ▸ If there is little transaction between local suppliers and the park's resident firms, examine whether potential local suppliers are lacking competitiveness in terms of cost, quality and technology.	Ministry of Industry and park operators	Work with park operators.	▸ Assess the regional activities that are relevant to industrial parks' specialized/priority sectors and procurement strategies. ▸ Develop long-term plans to assist the development of qualified and sustainable local industries, while setting the target value through negotiation with park operators.
	▸ Analyze region's industrial activities in connection to the industrial parks. ▸ Analyze the outsourcing or procurement strategies of the industrial parks. ▸ If there is little transaction between local suppliers and the park's resident firms, examine whether potential local suppliers are lacking competitiveness in terms of cost, quality and technology.	Ministry of Industry and park operators	Work with park operators.	▸ Assess the regional subcontracting activities in relation to industrial parks' procurement strategies. Work with park operators to set the target value.
	▸ Assess provided technical documentations and information on rental contracts and/or occupancy rates.	Ministry of Industry and park operators	Work with park operators.	▸ Conduct technical assessment to check the ratio of currently rented or used space in the industrial parks and work with industrial park operators to set the target value.

Tool 1.5. Sample template for regulatory mapping

Category of regulations	Subject topics	List of regulations (Examples drawn from Korean regulations)
Socio-economic	Job creation/training/skill development	▸ Vocational Education and Training Promotion Act ▸ Framework Act on Employment Policy
	FDI/Export	▸ Foreign Investment Promotion Act ▸ Guidelines For Operation of Foreign Investment Zones
	R&D/Investment in or facilitation of technological development	▸ Technology Development Promotion Act ▸ Korea Technology Finance Corporation Act ▸ Act on Special Cases Concerning Support for Techno parks ▸ Industrial Education enhancement and Industry-Academia-Research Cooperation Promotion Act
	Tax laws	▸ Restriction of Special Taxation Act
	Gender	▸ Act on Support for Female-Owned Businesses ▸ Equal Employment Opportunity and Work-Family Balance Assistance
	Community support/ corporate social responsibility	▸ Industrial Sites and Development Act ▸ Enforcement Decree of the Industrial Sites and Development Act ▸ Act on Assistance to Electric Power Plants-Neighboring Areas
Industrial competitiveness	Industrial growth	▸ Industrial Development Act ▸ Act on the Promotion of Collaborative Cooperation between large enterprises and Small-Medium Enterprises ▸ Chambers of Commerce and Industry Act
	SME	▸ Framework Act on Small and Medium Enterprises ▸ Small and Medium Enterprises Cooperatives Act
	Zone development (regulations related to developing SEZ, Export Processing Zones (EPZ), and Industrial parks)	▸ Industrial Sites and Development Act ▸ Industrial Cluster Development and Factory Establishment Act ▸ Enforcement Decree of the Industrial Cluster Development Act ▸ Special Act on Designation and Management of Free Economic Zones ▸ Act on the Development and Management of Logistics Facilities

Category of regulations	Subject topics	List of regulations (Examples drawn from Korean regulations)
Financial	Investment and subsidies	▸ Financial Investment Services and Capital Markets Act ▸ Act on the Special Accounts for Energy and resources-related Projects ▸ Act on Special Accounts for Environmental Improvement
Environmental	Climate change (mitigation & adaptation); Sustainability Environmental Impact Assessment (EIA); and Disaster Risk; Management (DRM)	▸ Framework Act on Environmental Policy ▸ Water Environmental Conservation Act ▸ Clean Air Conservation Act ▸ Environmental Technology and Industry Support Act ▸ Act on the Promotion of the Conversion into Environment-friendly Industrial Structure ▸ Framework Act on Low Carbon, Green Growth ▸ Waste Control Act ▸ Act on Promotion of Purchase of Green Products ▸ Environmental Health Act
Energy	Energy & Resource Efficiency	▸ Energy Act ▸ Energy Use Rationalization Act ▸ Act on the Promotion of Saving and Recycling of Resources ▸ Framework Act on Resources Circulation
Land-use planning	Land use/zoning/ urban & regional planning; Infrastructure development	▸ National Land Planning and Utilization Act ▸ Enforcement Decree of the National Land Planning and Utilization ▸ Road Act

* English version of these regulations is available in the following website: https://elaw.klri.re.kr/eng_service/main.do

Tools for implementing the Handbook Section 2: Implementing the EIP Framework in industrial parks

Tool 2.1. Memorandum of Understanding (MoU) template for eco-industrial park program initiative

Memorandum of Understanding

Between

[National Government or the Institution leading the EIP program]

And

[The Partner Industrial Park]

[Date]

This MEMORANDUM OF UNDERSTANDING ("Memorandum") represents a statement of intent by the [National government or the institution leading the EIP Program], [donor institution] (if any) and [partner industrial park] (each a "Party" and together, the "Parties") with respect to their proposed future collaboration-for the achievement of common objectives as described and outlined below.

WHEREAS:

(a) Description of the mission/mandates of [the national government or the institution leading EIP Program].
(b) Description of the mission/mandates of [partner industrial park]
(c) Description of the mission/mandates of [donor institution] (if any)

NOW THEREFORE the Parties will continue their discussions within the following framework:

A. Objective

Consistent with their respective mandates, the Parties desire to collaborate in developing a national framework on Eco-Industrial Parks ("EIPs") tailored for [name of the country] where required diagnostic study will be conducted in parallel by working with specific industrial parks in order to launch this framework. The framework will address areas that promote productivity, sustainability and competitiveness in the industrial parks through resource efficiency, green infrastructure, cleaner production, circularity (e.g. industrial symbiosis) and clean energy.

The proposed EIP Program would help reconstitute the technical and institutional capacity of the industrial parks and strengthen the quality and standardization on eco-efficiency, collective infrastructure, industrial symbioses and water circularity. It will also help raise the awareness and increase the involvement of the firms operating in the parks in the development, adoption and implementation of the National EIP Framework that is associated with promoting the [name of the country]'s long-term competitiveness and sustainable development.

B. Collaboration

(a) The Parties anticipate that their collaboration will focus on a number of specific substantive areas which would include, but not be limited to:

  (i) analytical research to demonstrate the technical opportunities and the impact of EIP interventions within [name of the partner industrial park] (e.g. energy efficiency, water efficiency, waste reduction, industrial symbiosis, and green infrastructure). [Name of the partner industrial park] would act as a focal point for [the national government or the institution leading the EIP program] to exchange knowledge and gather firm- or park-level data associated with waste production, resource utilization, electricity and natural gas consumption as the baseline of the EIP technical diagnostic study.

  (ii) regulatory diagnostic to map out the potential barriers that stifle EIP interventions. The expectation would be that [the national government or the institution leading the EIP program] would act as the focal point for [the donor institution], and responsible to exchange knowledge on the current legislative regime relating to industrial parks and productivity.

  (iii) providing industrial park-specific data to be sourced from the [the national government or the institution leading the EIP program]'s database to allow [the donor institution] to leverage the data such as specific electricity consumption, natural gas utilization etc.

  (iv) technical support to [the national government or the institution leading the EIP program] and [name of the partner industrial park] from [the donor institution] to conform to the developed national EIP framework. This would enable the industrial parks to enhance their industrial sustainability and competitiveness in global trade.

(b) To further achievement of their proposed common objective, the Parties would seek to collaborate in the following manner:

  (i) share knowledge, expertise and international best practices through the dissemination of capacity-building materials;

(ii) engage jointly in a dialogue with stakeholders and other interested parties in the activities being pursued under this Memorandum;

(iii) collaborate in enhancing the quality of monitoring and evaluation approaches to address efficiency, effectiveness, and predictability of the EIP regime;

(iv) collaborate on the promotion, preparation and organization of training programs, workshops, and peer to peer learning events to promote awareness and participate in the standards setting process;

(v) collaborate on the organization and execution of joint research projects and knowledge and learning events on subjects of primary interest;

(vi) plan joint activities in areas of common interests; and

(vii) evaluate periodically the effectiveness of their collaborative work with reference to their respective mandates and priorities.

(c) Each Party would contribute to the activities proposed to be undertaken pursuant to this Memorandum, in one or more of the following ways by:

(i) mobilizing its own staff in pursuit of the objective of this Memorandum;

(ii) engaging and funding its own consultants;

(iii) providing facilities for joint workshops, conferences, or training seminars; and

(iv) such other ways as each Party in its own discretion may determine.

C. Contact

This Memorandum provides a framework within which the Parties may develop and undertake collaborative activities. Each Party hereby designates and appoints below its representative with overall responsibility for implementing this Memorandum. The Parties may, by written notice to the other Parties, designate additional or different persons as points of contact, but the Parties expect to have only one person at a time designated as the person with overall responsibility for all activities undertaken pursuant to this Memorandum.

For [National Government or the institution leading the EIP Program/Initiative]	**For [Partner industrial park]**	**For [Donor institution] (if any)**
Name: Organization: Address: Tel: Fax: E-mail:	Name: Organization: Address: Tel: Fax: E-mail:	Name: Organization: Address: Tel: Fax: E-mail:

D. Steering Committee

(a) The Parties would expect to establish a steering committee to guide discussions relating to the EIP program. Such steering committee would have representatives of each of the Parties.

(b) The Parties would expect the steering committee to have regular meetings to discuss and oversee collaboration, any work plan, and progress of the activities.

E. General

(a) This Memorandum does not constitute an agreement or commitment by any Party to enter into or provide support for any specific activity or project. It is not the Parties' intention to create, and nothing herein shall be construed as creating, legal rights and obligations or any commitment whatsoever. Each Party shall have the discretionary right to terminate at any time any discussion whatsoever regarding the proposed objectives or this Memorandum. Specific arrangements for individual activities will be set forth in a document or work plans to be jointly formulated and agreed by the Parties, according to their policies and procedures.

(b) Nothing in this Memorandum is intended to be, or should be construed as a waiver of the privileges, immunities and exemptions of the Parties or their officers and employees, which privileges, immunities and exemptions are hereby specifically reserved.

(c) Any sharing of confidential information between the Parties will be subject to their respective policies and procedures relating to the disclosure of information.

(d) The Parties expect that this Memorandum and information with respect to the collaborative activities contemplated herein will be publicly disclosed by the signatory Parties. The Parties expect to consult with each other concerning the manner and form of any acknowledgement by a Party of any other Party's support regarding the activities.

In witness whereof, the Parties have caused this Memorandum to be executed as of the day and date written above.

For [National Government, the institution leading the EIP program/Initiative]	**[Partner Industrial Park]**	**[Donor institution] (if any)**
NAME: _____	NAME: _____	NAME: _____
TITLE: _____	TITLE: _____	TITLE: _____
SIGNATURE: _____	SIGNATURE: _____	SIGNATURE: _____

Tool 2.2. Sample discussion points and survey questions for site visits to industrial parks

These sample discussion points and questions can be used in implementing Step 2. Diagnostics of Section 1, as well as Step 1.1 Conduct Preliminary assessment of Section 2 of the Handbook.

1. Initiating discussion

(a) Availability and quality of data; any problems encountered during the initial data collection; and effective ways to collect more detailed data during technical diagnostics.

(b) Current economic and financial issues encountered at the industrial park, sector, and/or firm levels; and issues that affect technical applications and investments to promote green infrastructure, resource efficiency and industrial symbiosis network in the park.

(c) Major environmental concerns at the industrial park, sector, and/or firm level; and existing measures to deal with those environmental issues, including both conventional and emerging approaches to improve environmental sustainability of the industrial production processes.

(d) Current status of the existing social and green infrastructures within the park, as well as problems that the park operators experienced regarding the installation and management of these collective infrastructures; information about the existing or planned activities to develop and improve the social or green infrastructures within the park; and key barriers to and/or drivers for the investments in these infrastructures.

2. Institutional capacity of the industrial park management unit

(a) The number and qualifications of the employees working in the industrial park management unit or relevant directorate.

(b) Information about the organizational structure.

(c) List of major services that the management unit offers to the resident firms.

(d) Information about energy and environmental management units.

- Human resources
- Laboratory analyses of the relevant infrastructures and equipment
- List of services offered regarding energy and environmental management of the park
- Planned and/or on-going activities and investments to improve the quality of energy and environmental management services

3. Existing industrial park practices for data management and performance monitoring

(a) List of economic, environmental and social data collected on a regular basis, as well as methods used for collecting these data.

- Economic data:
- Environmental data:
- Social data:

(b) Existing tools and approaches used in the calculation and monitoring of economic, environmental, and social performance of the park operation, if there are any.

4. Existing policy framework regarding industrial park development and management

(a) Current industrial park development and management framework that could potentially affect EIP development. The drivers of or barriers to the current institutional setting.

(b) Major stakeholders and their roles in industrial park development and management from the perspective of EIP development.

(c) Regulatory issues or problems that industrial park operators may encounter in mainstreaming EIP approaches, as well as solutions to address these problems.

(d) Major financial issues and gaps for EIP development; alternative financial mechanisms and instruments that would enable EIP development.

5. Previous or ongoing projects or programs related to EIP development

(a) Current situations regarding resource and energy efficiency applications within resident firms.

(b) Information about the renewable energy investments undertaken by resident firms; list of active clusters within the park, sectors and key activities carried out under these investments.

(c) Information on existing industrial symbiosis relations between resident firms.

- Waste and by-product synergies:
- Energy exchange:
- Joint supply chain management:
- Shared logistics/transport:
- Technology/facility sharing:
- Other:

6. Social services offered by the industrial park management to the resident firms

(a) The cooperative education/training opportunities or activities offered to the resident firms; the level of resident firms' interests in skills development/training opportunities or activities.

b) List of volunteer and community support programs offered by industrial park to the resident firms.

c) Information about the interaction of the industrial park with the local communities/cities nearby.

d) List of any other social services park operators offer to its resident firms.

7. Further discussions and questions used for identifying resource-intensive sectors (if needed)

a) How does the park operator define resource-intensive sectors/firms (total resource consumption, or consumption per value added etc.) within the park?

b) Which of the following criteria are more relevant in terms of identifying sectors and resident firms in the selected industrial park? Please rate on a scale from 1 to 12 (1 being least important, 12 being more important).

Criteria for identifying resource-intensive sectors

Criteria	Scale (1-12)
Economic performance (value added, contribution to the national economy, employment, export generation etc.)?	
Energy intensity	
Raw material intensity	
Water intensity	
Waste (solid, hazardous etc.) generation	
Air emission generation	
Total number of firms represented in that sector in the selected industrial park	
Replicability of the resource efficiency measures in other sectors/firms in the industrial park	
Applicability of eco-efficiency measures (suitability of the processes etc.)	
Institutional capacity (human resources, previous projects, management vision etc.)	
Commitment for their cooperation throughout the project	
Availability of data for technical analyses	

c) Which sectors and resident firms within the selected industrial park are important in following areas?

- Economic performance (value added, contribution to national economy, employment, export level etc.):
- Energy intensity:
- Raw material intensity:
- Water intensity and wastewater generation:
- Waste (solid, hazardous etc.) generation:
- Air pollutants and GHG emissions:

d) Which sectors and resident firms within the selected industrial park are suitable for resource efficiency applications, considering the following?

- Applicability of eco-efficiency measures (suitability of the processes etc.)
- Institutional capacity (human resources, previous projects, management vision etc.)
- Availability of data for technical analyses

Tool 2.3. Example of pre-feasibility assessments for specific resource efficiency processes

This example focused on identifying potentials for improving the environmental performance of selected industrial parks by implementing the EIP frameworks. It can be used in implementing Step 1.2 Conduct pre-feasibility assessment and secure commitment of stakeholders under Section 2 of the Handbook.

Firm-level resource efficiency (e.g. energy efficiency, water efficiency, waste minimization) audits or pre-feasibility assessments are undertaken in the selected firms (e.g. firms selected in the resource intensive sectors). Since resource efficiency approaches require cooperation among and full-commitment from the resident firms, voluntary participation of the firms is preferable. The firms who are willing to participate in the pre-feasibility assessments may submit their application forms to the park operator or its EIP management team. Firms may be selected using the criteria listed below (the selection criteria need be modified and enriched based on the type of industrial park and the industry sectors that are operating within the park):

- Economic performance (e.g. value added, contribution to national economy, employment, export level) of the firms
- Energy intensity of the firms
- Raw material intensity of the firms
- Water intensity of the firms
- Waste generation (e.g. solid and hazardous waste)
- Emission of air pollutants and GHGs
- Total number of firms represented in the selected sector within the selected industrial park
- The replicability of resource efficiency measures in other sectors and/or firms within the selected industrial park
- Technological applicability of resource efficiency measures
- Overall management capacity of the firm to implement resource efficiency measures (e.g. human resources, previous projects or efforts to introduce resource efficiency measures, management vision to improve resource efficiency)
- Commitment to cooperate throughout the project
- Availability of data to initiate technical diagnostics

Firm-level EIP opportunities include solutions to increase resource efficiency including energy/water efficiency, pollution prevention and waste minimization. A practical assessment that analyzes material, energy, water and waste flows entering and leaving a process is the critical first step to increase resource efficiency. A holistic step-wise resource efficiency assessment must be conducted in order to:

- understand the common problems experienced by firms in terms of resource efficiency losses;
- identify opportunities for increased resource efficiency (e.g. improving water and energy efficiency, reducing operational costs, and reducing operational costs); and
- identify opportunities for pollution prevention and GHG emissions reduction at source (e.g. minimizing the use of hazardous raw materials and reducing risks to human health)

The findings from this analysis can be implemented based on specific equipment and operational procedures that will have the greatest impact in terms of resource savings.

The firm-level resource efficiency audits/assessments can be conducted following steps below:

- Step 1. Scoping the assessment and establishing a technical assessment team
- Step 2. Technical surveys and data gathering
- Step 3. Data analysis and the evaluation of environmental performance
- Step 4. Opportunity assessment

Step 1: Scoping the assessment and establishing a technical assessment team

Scoping the assessment is one of the most critical steps for successful resource efficiency assessment study. It starts with obtaining the commitment and involvement of top management of the firm and establishing a team for conducting technical diagnostic work. The park operator can create or convene a team involving technical experts and officials from the selected firms to prepare a plan for conducting technical surveys, assign duties to team members, and conduct technical surveys.[4] A data collection form can be filled by the officials from selected firms, which will help the assessment team prepare and scope the technical surveys (see Tool 2.6 for the example of data collection form for resource efficiency assessments).

Step 2: Technical surveys and data gathering

A technical survey is one of the most effective techniques for getting the first-hand information on production processes that are particularly resource-intensive and polluting. The survey is also very useful for identifying ways to enhance environmental performance in each firm while reducing the manufacturing cost. It is often conducted in collaboration with selected firms. An initial technical survey is carried out together with staffs at the resident firms and takes about a half-day or full day to complete.

The process flow diagrams of the selected resident firms are developed based on collected information on the inputs and outputs of major production processes.[5] Monthly resource consumption, waste/emission generation data and associated expenditures are compiled from different sources provided by the staffs of the resident firms. For this purpose, information sources like process-based record sheets as well as water/energy/chemical bills are analyzed. Moreover, informative catalogs of equipment and material safety data sheets (MSDS)[6] of chemicals (provided by the suppliers of products/chemicals) are also used for collecting relevant data. While conducting the technical surveys, the team should also record housekeeping lapses such as leaks of steam or water, leaks from processes or the condensate of the steam system, fuel oil leaks, compressed air leaks or any obvious wastage going into the drain. These housekeeping lapses must be recorded together with existing documentation on the process control. Observations are outlined in the form of a table or eco-map[7] and sankey-diagrams[8] of major utilities. The evaluation of the management and organizational practice within a firm (e.g. the quality of process documentation or legal compliance) needs to be also included in the resource efficiency assessment.

Technical surveys should consider the fact that each firm has different procedures and methods for monitoring and managing their resources/wastes, and collecting data. For example, some of the firms may record process-based water consumption while others do not. Some may monitor resource consumption while others do not address this issue. All inputs and outputs (including wastes) regarding the flow of resources, materials or energy must be quantified, characterized and recorded. The measurements or estimates of quantities can be done on-site if relevant data is not readily available.

4 This team can eventually turn into an EIP management team as described in Step 2 of Section 2

5 Process flow diagram rules and standards include the following:
ISO 10628: Flow Diagrams for Process Plants. https://www.iso.org/standard/18721.html
ISO 10628-1: 2014: Diagrams for the chemical and petrochemical industry. https://www.iso.org/standard/51840.html

6 A material safety data sheet (MSDS) is a technical document which provides detailed and comprehensive information on a controlled product/chemical related to: (i) health effects of exposure to the product (ii) hazard evaluation related to the product's handling, storage or use (iii) measure to protect workers at risk of exposure and (iv) emergency procedures. MSDSs are generally provided by the suppliers of products/chemicals along with the informative catalogs.

7 Eco-map is a map of the facility, seen from above, including infrastructures, equipment, and major production units. Eco-mapping is a useful tool for the survey team to use, especially for capturing the observations made during the technical surveys. It is a simple and practical tool to represent visually issues of concern as well as note some of the good practices in terms of resource efficiency.

8 Sankey diagrams summarize all the energy/material transfers taking place in a process. They are a specific type of a flow diagram, in which the width of the arrows is shown proportionally to the flow quantity. They are typically used to visualize energy or material transfers between processes.

Step 3: Data analysis and the evaluation of environmental performance

Then, data analysis and the assessment of environmental performance should be carried out following the performance indicators set in the International EIP Framework. According to the ISO, environmental performance evaluation is "a process to facilitate management decisions regarding an organization's environmental performance by selecting indicators, collecting and analyzing data and assessing information against environmental performance criteria."[9] Methodologies to evaluate various categories of environmental performance are being developed and widely used in various sectors to identify the processes/practices that need to be improved by manufacturing enterprises.[10] In general, the assessment can be conducted using the data collected during the site visits and technical surveys as well as through regular communication with the firm officials via e-mails and telephone/conference calls.

In case the national EIP framework is in place, practitioners should help the park operator or its EIP management team assess the current environmental performance using the environmental performance indicators set in the national EIP framework as a benchmark/reference (see Tool 1.4 on how to set up the target values of environmental performance indicators). The collected data are processed and analyzed to calculate the level of current environmental performance of the firms, which are expressed in numeric terms. This assessment allows practitioners identify gaps between the current level of environmental performance and the target values set in the environmental categories of the International or national EIP framework (see Tool 2.4 for details). Then, practitioners can list potential technical solutions that firms can implement to reduce the negative environmental impact and high production cost associated with their production processes and practices.

Step 4: Opportunity assessment

Practitioners can conduct opportunity assessment to help find possible and applicable resource efficiency solutions among the list of identified options. Opportunities to improve resource efficiency at the firm level can be identified by using the assessment criteria suggested below:

- Environmental benefits
- Economic viability
- Adaptability/applicability of the technology to employed processes
- Quality requirements
- Occupation, health and safety requirements
- Long-term sustainability
- Operational and maintenance requirements
- Examples of successful applications
- Level of technology (or scale of innovation)
- Complexity of the application
- Cross-media (secondary) effects
- Other

The criteria may be chosen based on the needs and expectations of the firm. An initial evaluation of all identified opportunities will generate a short-list of resource efficiency opportunities.

9 Dias-Sardinha, I., & Reijnders, L. (2001). Environmental performance evaluation and sustainability performance evaluation of organizations: an evolutionary framework. Eco-Management and Auditing, 8(2), 71–79.

10 Jiang, Z., Zhang, H., & Sutherland, J. W. (2012). Development of an environmental performance assessment method for manufacturing process plans. The International Journal of Advanced Manufacturing Technology.

Tool 2.4. Gap analysis: Guidelines to assess gaps between the current practices in industrial parks and the performance requirements set in the International EIP Framework

This tool can be used in implementing Step 2 of Section 1, as well as Step 1.2, 1.3 and Step 3 of Section 2 of the Handbook.

Assessing gaps between the prerequisite requirements and the current status of industrial parks

If park operators are evaluating to be part of a national EIP framework, the prerequisites must be matched as a mandatory condition to be assessed and certified by EIP coordinating or regulatory agencies (Step 3.2 Establish governance structures and coordinating agencies in Section 1).

In case the national EIP framework is absent, action plans must include all the necessary interventions to meet the prerequisites described in the International EIP Framework (see Step 1.3 Develop a Park-level Action Plan). In this case, the verification of the prerequisites will be conducted by the internal audit committee (Step 3. Performance audits of Section 2).

The internal audit committee should check whether the park operator and its performance requirements of the International EIP Framework have been met by the park operator that has integrated EIP management functions. It has to collect the relevant data from the EIP management team/department, compare them with the checklist of prerequisites per each issue area (park management, environmental, social and economic) described in the International EIP Framework (see Tool 2.4 Table 1) and verify the accomplishment of each single required item.

Each prerequisite associated with each different area of the International EIP Framework needs to be verified. Practitioners would need to implement corrective actions in case they find any gaps between the current practices and the requirements set in the International EIP Framework. The following table shows steps practitioners need to take in order to conduct the diagnostic of the prerequisites.

Tool 2.4: Table 1. Park-level Gap Analysis and Corrective Actions to Meet EIP Performance Prerequisites[11]

	Topic	Sub-topic	Gap Analysis	
Park management	Park management services	Park management entity	▸ Does a distinctive park management entity, park operator or alternative agency exist to handle park planning, operations and management, and monitoring?	
		Park property, common infrastructure and services	▸ Does the park management entity manage and maintain the industrial park property, common infrastructure, and services as prescribed in the tenant contract and the park's Master Plan?	
	Monitoring and risk management	Monitoring EIP performance and critical risk management	▸ Does the park management entity maintain a monitoring system that can be used in tracking the progress on environmental, social and economic performance at the park level?	
			▸ Does the park management entity examine disaster risks (e.g. flooding, earthquakes, droughts/extreme water shortage)?	
			▸ Does the park operator examine critical risk/hazard factors and plan related responses for handling hazardous materials, liquid and gaseous effluents, including transportation and disposal of those substances?	
			▸ Does the park management entity have a risk management plan in place to deal with the adverse impacts of climate change and extreme weather events (e.g. heat waves, droughts, storms, flashflood)? Are the adaptation opportunities for infrastructure and services identified?	
		Information on applicable regulations and standards	▸ Does the park management entity have a functioning system that enables park to comply with local and national regulations, and international standards applicable to the industrial park?	
	Planning and zoning	Master Plan	▸ Has a Master Plan (or a planning document that is equivalent to the Master Plan) been developed for industrial parks? ▸ Is it reviewed regularly? ▸ And, does the Master Plan include the following: ▹ Site selection study based on various risk analyses including seismic risk assessment; ▹ Essential and efficient infrastructure, utilities and transportation network; ▹ Environmental and social impact assessment; ▹ Internal park land zoning; ▹ Buffer zone around the park; ▹ Procedure to safely locate high risk industries; ▹ Plans to locate and cluster synergistic industries. ▸ Does the Master Plan integrate elements elaborated in the International EIP Performance requirements?	

11 See also Table 12: Park-level action Plan Template to Meet EIP Performance Prerequisites in the Handbook.

	Checklist	List of corrective actions if prerequisites are not met (If the answers are no):
	Y/N	▸ See Step 2.2 of Section 2 in the Handbook.
	Y/N	▸ Identify the reasons for the lack of service. This information will be helpful in terms of identifying the needs for reorganizing the park operating body or additional skills and services required to effectively operationalize the EIP framework. ▸ Increase the quality of service. ▸ Review the level of service fees to see if they are insufficient to sustain the park management businesses.
	Y/N	▸ See Step 3 of Section 2 in the Handbook.
	Y/N	▸ Conduct disaster risk assessment of the parks and include its findings in a monitoring system ▸ Useful resources for park operators: ▹ SIA Toolbox – Climate Change: https://www.sia-toolbox.net/phase-of-intervention/details/295 ▹ https://www.climate-expert.org/en/home/(GIZ)
	Y/N	▸ Make a critical risk/hazardous factor assessment and include the findings in a monitoring system ▹ Industrial disaster risk management and hazard assessment tools and best practices are available: http://www.hrdp-idrm.in/e5783/e17327 ▹ https://www.global-chemicals-waste-platform.net/home.html
	Y/N	▸ Assess climate risks faced by industrial parks and develop a risk management plan to deal with the effects of climate change. Useful resources: ▹ SIA Toolbox – Climate Change: https://www.sia-toolbox.net/phase-of-intervention/details/295 ▹ https://www.climate-expert.org/en/home/(GIZ) ▹ Guideline for adaptation and increasing resilience of industrial parks to the impacts of climate change https://www.sia-toolbox.net/solution/guideline-adaptation-and-increasing-resilience-industrial-parks-impacts-climate-change (GIZ)
	Y/N	▸ Establish a functioning system to ensure that parks and resident firms comply with local norms and regulation, referring to Step 3 of Section 2.
	Y/N	▸ Involve key stakeholders and agree on a Master plan focusing on the main topics highlighted in the gap analysis. The Master plan can be revised annually or biannually. ▹ Useful resources: SIA Toolbox – Master Planning: https://www.sia-toolbox.net/phase-of-intervention/details/299 ▸ Assess the International EIP Framework to integrate its elements into developing the Master plan.

	Topic	Sub-topic	Gap Analysis
Environmental	Management and monitoring	Environmental/Energy Management Systems (EMS and EnMS)	▸ Does the park management entity operate an environmental/energy management system in line with internationally certified standards (e.g. ISO 14001, ISO 50001), monitoring park performance and supporting resident firms?
	Energy	Exchange of waste heat energy	▸ Are the industrial heat recovery strategies in place to identify opportunities for heat and energy recovery for the major energy-consuming firms in the park? (typically, those that consume at least 10-20 percent of total energy consumed at the park)
		Energy efficiency	▸ Do the energy efficiency measures exist for the park management infrastructure and major energy consuming resident firms?
	Water	Water efficiency, reuse and recycling	▸ Do parks and resident firms have plans and documented evidence to increase water reuse in the short and medium term? The plans could be related to reuse of industrial effluents and rainwater/storm water collection.
	Climate change and the natural environment	Air, GHG emissions and pollution prevention	▸ Is a program established to monitor, mitigate and/or minimize GHG emissions, such as carbon dioxide, methane, nitrogen, and so on?
			▸ Is there clear evidence of steps taken into introduce mitigation activities at the park level?
		Environmental assessment and ecosystem services	▸ Does the park operator/park management entity have a plan in place to assess operational environmental impacts and aims to reduce the environmental impact on prioritized local ecosystem services?
Social	Social management systems	Management team	▸ Does the park operator/park management entity have dedicated personnel to plan and manage social quality standards?
	Social infrastructure	Primary social infrastructure	▸ Is social infrastructure included in the site master plan and fully operational?
Economic	Employment generation	Type of employment	▸ Does the park/operator park management entity have plans to generate specific number and type of jobs in line with the national government targets? ▸ Do industrial parks generate employment opportunities for local communities?
	Local business and SME promotion	SME development	▸ Does the park operator/park management entity promote the establishment of SMEs that add value to the resident firms in the industrial parks?
	Economic value creation	Market demand for EIP services and infrastructure	▸ Does the industrial park fulfil the relevant government targets, including domestic, FDI and tax revenues? ▸ Does the park management entity track the economic performance of the industrial parks? ▸ Are market demand and feasibility studies developed for green infrastructure and service offerings?

	Checklist	List of corrective actions if prerequisites are not met (If the answers are no):
	Y/N	▸ Proceed with the implementation of suggested EMS/EnMS such as: ▹ ISO 14001: https://committee.iso.org/sites/tc207sc1/home/projects/published/iso-14001---environmental-manage.html ▹ ISO 50001: https://www.iso.org/standard/51297.html ▹ IFC. 2015. Environmental and Social Management System Toolkit https://www.ifc.org/wps/wcm/connect/38089d8048377ccb9384f7299ede9589/ESMS_Toolkit_General.pdf?MOD=AJPERES ▹ UNIDO. 2017. Enhancing Industrial Energy Efficiency and Energy Management Systems (2017) https://www.unido.org/sites/default/files/files/2017-12/P3_1_KN_UNIDO_Emtairah_Matteini.pdf
	Y/N	▸ Assess (via survey) the consumptions of fuel from the major energy consumers in the park, identify potential interventions and define strategies for effective communication and implementation of the action plan. ▸ Survey forms available in the Tool 2.2 can be used.
	Y/N	▸ Assess (via survey) and define energy efficiency measures. ▸ Collect best practices and identify strategies for implementing the energy efficiency measures (list of action/schedule).
	Y/N	▸ Assess (via survey) water consumptions and water reuse methodologies applied in the park. ▸ Identify best practices and include them into an implementation plan (action/schedule).
	Y/N	▸ Assess (via survey) the monitoring systems and methodologies adopted in the park for the emission control, including its plans to mitigate main pollutants and GHGs. If there is no relevant measure or plan adopted at the park level, establish a program using internationally available guideline such as ISO14064/WBCSD Corporate GHG Accounting protocol. ▸ Structure an intervention plan that includes detailed action/schedule for the implementation of the mitigation strategies.
	Y/N	
	Y/N	▸ Identify operational environmental impacts and prepare a plan to assess them.
	Y/N	▸ Assess via survey if firms in the park have departments for planning and managing social quality standard and identify the form of collaboration to apply their best practices. Select and appoint qualified resources to manage these activities.
	Y/N	▸ Identify social infrastructures and include in the site master plan interventions to make them fully operative. Useful resources: ▹ SIA Toolbox: https://www.sia-toolbox.net/solution/planning-and-design-aleap-green-industrial-park-grip
	Y/N	▸ Assess (via survey) hiring plans from firms in the park and compare the data with national targets. - Include in the analysis the impact of resource efficiency measurements on job creation as they require new skills and expertise. ▸ Assess (via survey) historical employment data from the firms in the park to evaluate main impacts of the selected industrial parks on local community measured in terms of job creation. ▸ Monitor these data to inform firms in including proximity factors in the selection criteria to stimulate the hiring of personnel from local communities.
	Y/N	▸ Assess tenant composition and identify the percentage of SMEs operating in the park. If possible, include park-level solutions for SMEs that can help create synergies with other firms in the park.
	Y/N	▸ Assess main financial indicators for the park and monitor them. ▸ Implement feasibility studies and implement new services related to green infrastructures. ▸ Market demand and feasibility for green infrastructure/service offerings can be assessed as follows: ▹ Market Demand: Conduct survey to understand the needs of the firms related to green infrastructures (what they expect) ▹ Feasibility assessment: Based on the findings from the survey, identify costs/benefits associated with the potential services that the park could offer to the firms and evaluate the ROI for the park associated with each initiative.

Assessing gaps between the performance requirements and the current status of industrial parks

Parks operating under the national EIP frameworks and those operating in the absence of the national frameworks need to take different approaches for performance gap analysis. Parks operating under a national EIP framework already have target values set for the performance indicators have been set by adapting target values to the local norms and industry benchmark (see Step 3 of Section 1 in the Handbook). EIP management teams need to assess periodically the performance of EIP programs and measures implemented within the parks. They also need to inform the EIP coordinating agency – the agency established following Step 3.2 of Section 1 in the Handbook – that the park has achieved target values of all the performance indicators set in the national EIP framework (park management, environment, social, and economic performance indicators). Parks operating without the national EIP framework should derive the target values of the EIP performance indicators from the International EIP Framework. In this case, the assessment of the diagnostic activities needs be performed by the internal audit committee (see Step 3 of Section 2 in the Handbook).

Monitoring and evaluation mechanisms to track progress toward EIP performance targets at the park level are as important as the ones established at the national level. The monitoring and evaluation that is carried out at the park level in a transparent and accountable manner will enable practitioners check whether the park has potential to be selected as a pilot case under the national EIP program. The park operator should in turn provide performance indicators at the park level, which would also demonstrate their progress toward meeting the prerequisite indicators set at the national level.

After having met the prerequisite criteria established in the national EIP framework (if the national EIP framework is in place), an EIP can go further to be 'compliance plus' or even beyond EIP performance requirements. To sustain its EIP path, the park operator should first develop an EIP program with a realistic set of targets. The internal auditing committee established within the park operating body or the EIP management team is tasked with tracking the prerequisites status, monitoring EIP performance indicators and identifying any remaining gaps during the implementation of the EIP program.

Once again, availability, applicability and limitation of data should be taken into consideration when park-level indicators are developed. This will help ensure that the performance of resident firms and other relevant stakeholders is monitored, managed and communicated effectively. It is also recommended that practitioners help develop EIP performance indicators based on the International EIP Framework and adapt them to the local norms and industry benchmarks. In the following table, we provide the list of EIP performance indicators with a practical guideline and information on what practitioners can do at the park level to accomplish the target values set for the national EIP performance indicators.

Tool 2.4: Table 2. How to Meet EIP Performance Indicators at the Park Level

	Topic	Sub-topic	Indicator
Park management	Park management services	Park management empowerment	Proportion of firms in the industrial park to have signed a residency contract/park charter/code of conduct[12] (depending on what is legally binding on park firms according to the existing legislation in the country' and additional legally binding arrangements that empower the park management entity to perform its responsibilities and tasks and charge fees (sometimes absorbed in rental fees) for common services. This may include transparent fees for services pertaining to the achievement of EIP performance targets.
		Park management entity property and common infrastructure	The resident firms indicate satisfaction with regard to the provision of services and common infrastructure by the park management's entity (or alternative agency, where applicable).
	Monitoring and risk management	EIP performance and critical risk management	Park management entity regularly monitors and prepares consolidated reports regarding the achievement of target values as documented in the International EIP Framework to encompass the following: ▸ Environmental performance; ▸ Social performance; ▸ Economic performance; ▸ Critical risk management at the level of the park.
Environmental	Management and monitoring	Environmental/ energy management systems (EMS, EnMS)	Proportion of resident firms, with more than 250 employees, which have an environmental/energy management system in place that is in line with internationally certified standards.
	Energy	Energy consumption	Proportion of combined park facilities and firm-level energy consumption, for which metering and monitoring systems are in place.
		Renewable and clean energy	Total renewable energy use in the industrial park is equal to or greater than the annual national average energy mix.
			Park management entity sets and works toward ambitious (beyond industry norms) maximum carbon intensity targets (maximum kilograms of carbon dioxide equivalent ($kgCO_2e$)/kilowatt hour (kWh)) for the park and its residents. Targets should be established for the short, medium, and long term.

12 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 operator with the necessary powers.

	Unit	Implementation
	Percentage of firms (%)	▸ Perform an analysis of residents' membership contracts. Check data compared to the total number of firms in the park. Examine the result with target value. Fix anomalies by settling the contracts not yet formalized.
	Percentage of firms (%)	▸ Perform surveys to assess resident firms' satisfaction with common infrastructure and services provided by the park operator. Identify actions to address the issues with the provision of services and fix/replace/improve existing infrastructures if they cause inefficiencies to resident firms. After the implementation of the actions for improvement, conduct follow-up surveys to monitor whether the resident firms' satisfaction level has increased.
	Frequency of reports	▸ Set up a reporting management system in line with EIP performance indicators (see Step 3 and Step 4 of Section 2 in the Handbook). In case performance monitoring reports are not frequently released, additional actions may be required to improve the effectiveness of data collection, processing and analysis.
	Percentage of firms (%)	▸ Run a survey to examine whether resident firms with more than 250 employees have EMS in place in line with international standards. In case the requirement is not met, the park operator can arrange meetings or workshops with large firms (with more than 250 employees) operating in the park to inform them about the importance of investing in a EMS/EnMS.
	Percentage of combined park and firm level energy consumption (%)	▸ Run a survey to assess installed metering systems. Based on the results, the park operator can help the resident firms adopt metering and monitoring systems to track the level of their energy consumption within the park and identify potential inefficiency in the provision of the services. The result of the monitoring can be used as a powerful tool to negotiate with local utilities on various ways to improve the efficiency of energy consumption of the park.
	Percentage of renewable energy use in park relative to national average (%)	▸ Assess the total renewable energy capacity installed and consumed in the park and compare it to national average (data should be available at the national level or from international organizations). In case the percentage is lower than national average, the park operator can increase the percentage of renewable energy use within the park by purchasing the power from green utility or investing in green infrastructures. ▸ Internationally available sources include: ▹ Regulatory Indicators for Sustainable Energy (RISE) http://rise.esmap.org/ ▹ International Energy Agency (IEA) https://www.iea.org/
	Kg CO_2e/kWh	▸ In case the target is not met, the park operator can develop and implement various efforts to decarbonize park operation. For example, it can replace fossil fuels with renewable sources of energy for operating collective infrastructures within the park, increase the percentage of electricity purchased from utilities using renewable source of energy, and so on. ▸ Use standard tools to calculate carbon intensity indicators associated with industrial park's activities: see Carbon Emission Estimator Tool (CEET) developed by IFC for the industry sector: https://www.ifc.org/wps/wcm/connect/461d74804d1dc46892e7d7f81ee631cc/CEET+Tool+Quick+Start+Guide+10102012.docx?MOD=AJPERES

	Topic	Sub-topic	Indicator	
Environmental	Energy	Energy Efficiency	Park management entity sets and works toward ambitious maximum energy intensity targets per production unit (kWh/$ turnover) for the park and its residents. Targets should be established for the short, medium, and long term.	
	Water	Water consumption	Total water demand from firms in industrial park which do not have significant negative impacts on local water sources or local communities.	
		Water treatment	Proportion of industrial wastewater generated by industrial park and resident firms, which is treated to appropriate environmental standards.	
		Water efficiency, reuse and recycling	Proportion of total industrial wastewater from firms in the park are reused responsibly within or outside the industrial park.	
	Waste and material use	Waste/by-product re-use and recycling	Proportion of solid waste generated by firms, which is reused by other firms, neighboring communities, or municipalities.	
		Dangerous and toxic materials	Proportion of firms in park, which appropriately handle, store, transport and dispose of toxic and hazardous materials.	
		Waste disposal	Maximum proportion of wastes generated by firms in the industrial park which go to landfills.	
	Climate change and the natural environment	Flora and fauna	Minimum proportion of open space in the park used for native flora and fauna.	
		Air, GHG emissions and pollution prevention	Proportion of firms in park which have pollution prevention and emission reduction strategies to reduce the intensity and mass flow of pollution/emission release beyond national regulations.	
			Proportion of largest polluters in industrial park which have a risk management framework in place that: (a) identifies the aspects which have an impact on the environment and; (b) assign a level of significance to each environmental aspect.	

	Unit	Implementation
	kWh/$ turnover	▸ Use standard tools to calculate carbon intensity indicators associated with industrial park's activities. In case the target is not met, the park operator can provide further support for the resident firms, by arranging workshops that highlight the need for investing in energy efficiency measures and industrial symbiosis interventions.
	Percentage of water demand	▸ Assess (via survey) the amount of water consumed at the park. ▸ In case the target is not met, identify the list of resident firms that consume large amount of water from local sources shared with local communities. The park operator can also design and implement water efficiency and industrial symbiosis initiatives to reduce the impacts of resident firms' extensive water usage on local communities.
	Percentage of waste water treated/total waste water	▸ Request the local waste water treatment plants to share data on the amount of industrial wastewater treated. In case target is not met, identify waste water effluents that are not treated and implement interventions (e.g. upgrading or retrofitting the existing treatment plants) to increase the capacity of waste water treatment plants within the park.
	Percentage of water reused/ total water consumed	▸ Assess (via survey) the reuse of water in the firms of the park. In case these data are not available, assume the quantity of water reuse to be equivalent to the total treated waste water. In case the target is not met, park operator can implement industrial symbiosis interventions to increase the usage or reuse of treated waste water.
	Percentage of solid waste reused/total waste	▸ Assess (via survey) total recycling capacity in the firms of the park. Data should be provided also by the local municipality or waste management facility operator. If the target is not met, the park operator can identify industrial symbiosis interventions to increase the usage of waste and by-product.
	Percentage of firms	▸ Data should be provided by or available from resident firms in the park and also by the local municipality or waste management operator. If not, run a survey to obtain relevant data. ▸ If the target is not met, identify potential intervention areas including the opportunities for industrial symbiosis, for increasing services (in-house or out-sourced) related to toxic and hazardous waste management.
	Percentage of waste to landfill	▸ Data should be provided by or available from local municipality or waste management facility operator. ▸ If the target is not met, design and implement interventions to increase waste reuse and by-product exchange, which can also promote the implementation of industrial symbiosis strategies within the park.
	Percentage of open space	▸ Check the site plans, design, and current layout of the park. ▸ In case the target is not met, park operator can increase the green space within the park by planting trees or installing green stormwater infrastructure. It can also require firms to increase the amount of local flora and fauna spaces within their buildings or facilities.
	Percentage of firms in park that have pollution prevention and emission reduction strategies	▸ Run a survey to estimate the percentage of the resident firms with pollution prevention and emission reduction strategies. In case the target is not met, the park operator can work with local environmental agencies, universities and tenant firms to identify strategies to reduce emissions beyond national levels.
	Percentage of largest emitters	▸ Run a survey to identify large emitters in terms of the level of their CO_2, CH_4, N_2O, CFCs, HFCs, SOx, and NOx emissions. The survey should include following questions: whether these emitters have monitoring systems in place; whether they have monitored emissions (flow rate, pollutants and GHGs); and whether they have any emission reduction strategies in place. ▸ If the target is not met, park operators can for instance establish a knowledge-sharing platform targeting large emitters to raise their awareness regarding various environmental risk management strategies and the need to implement these strategies.

	Topic	Sub-topic	Indicator	
Social	Social management systems	OH&S management system	Percentage of all firms in the industrial park with more than 250 employees that have a well-functioning OH&S management system in place.	
		Grievance management	Percentage of grievances received by the park management entity which are addressed within 90 days.	
			Percentage of grievances received by the park management entity, which were brought to conclusion.	
			Percentage of all firms in the industrial park with more than 250 employees that have a code of conduct system in place to deal with grievances.	
		Harassment response	Percentage of all firms in the industrial park with more than 250 employees that have a harassment prevention and response system in place.	
	Social infrastructure	Primary social infrastructure	Percentage of the surveyed employees' reporting satisfaction with social infrastructure.	
		Industrial park security	Percentage of reported security and safety issues that are adequately addressed within 30 days.	
		Capacity building	Percentage of all firms in the industrial park with more than 250 employees with a program for skills/vocational training and development.	
			Percentage of female workforce who benefit from available supporting infrastructure/ programs for skills development.	
	Local community outreach	Community dialogue	Percentage of the surveyed community members that are satisfied with the community dialogue.	
		Community outreach	Number of outreach activities implemented by the park management entity annually that are regarded as positive by over 80 percent of the surveyed community members.	

	Unit	Implementation
	Percentage of firms	▸ Run a survey among the resident firms with more than 250 employees within the park to examine whether they have OH&S management systems in place. ▸ If the target is not met, the park operator needs to monitor the resident firms and provide them with support to help settle issues relevant to the OH&S management.
	Percentage of grievances	▸ Conduct surveys at park level to assess the current status of grievance management.
	Percentage of grievances	
	Percentage of firms	
	Percentage of firms	▸ Conduct surveys at park level to assess the current status of harassment and strategies to manage harassment. ▸ If the current performance does not meet the target, the park operator can monitor and provide support for resident firms with training programs or materials that highlight effective tools to prevent harassment in the workplace.
	Percentage of surveyed employees	▸ Conduct surveys at park level to assess employees' satisfaction with social infrastructure provided by park operators. If the target is not met, increase the quality of services connected to social infrastructures in accordance to the key findings of the surveys.
	Percentage of reported security and safety issues	▸ Conduct surveys at park level to assess safety and security issue management. In case the target is not met, the park operator can increase the quality of safety and security services in accordance to the key findings of the surveys.
	Percentage of firms	▸ Conduct surveys at park level and with resident firms to examine existing programs for skills/vocational training and development. If the findings from the survey indicate that the current practice does meet the performance target, the park operator can work with the large tenant firms to develop skills/vocational training programs or establish training centers.
	Percentage of female workforce	▸ Conduct surveys at park level to assess infrastructure/programs for skills development and gender statistics. ▸ If the target is not met, park operators can work with resident firms hiring a large number of female workers to develop training programs and centers.
	Percentage of surveyed community members	▸ Conduct surveys with local communities within a reasonable radius from the industrial park to assess their satisfaction with park's efforts to inform and engage communities on the matters that affect them. ▸ In case the target is not met, identify strategies that can engage local communities more effectively on the matters that affect the communities. Identify existing communication channels and methods that are often used by local communities and leverage them.
	Number of outreach activities per year	▸ Conduct surveys with local communities within a reasonable radius from the industrial parks to assess their satisfaction with the park's outreach activities. If the target is not met, re-design and implement outreach activity programs in accordance with the key findings of the survey.

	Topic	Sub-topic	Indicator	
Economic	Employment generation	Local employment generation	Percentage of total workers employed in industrial park who live within daily commuting distance.	
		Type of employment	Percentage 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.	
	Local business and SME promotion	Local value added	Percentage of resident firms using local suppliers or service providers for at least 80 percent of their total procurement value.	
			Percentage of total procurement value of park management entity supplied by local firms or service providers.	
	Economic value creation	Investment-ready park for firms	The ratio of rented or used space by resident firms compared to the total amount of available space earmarked for resident firms within industrial park.	

	Unit	Implementation
	Percentage of employees	▸ In partnership with park operator and the representatives of resident firms and using sampling techniques, conduct surveys with workers in the industrial park to assess the actual percentage of workers employed who live within daily commuting distance. ▸ If the target is not met, the park operator needs to work with local governments and municipalities to develop various programs (including programs that increase rapid public transportation routes) to increase the percentage of employees who live within daily commuting distance.
	Percentage of employees	▸ In partnership with park operator and the representatives of resident firms and using sampling techniques, conduct surveys with workers in the industrial park to assess the actual percentage of workers employed with permanent contracts over the total number of workers in the park. ▸ If the target is not satisfied, the park operator can engage local communities and municipalities to provide various skills training programs that can help increase the local employment rate, and improve the skills of human resources to help meet the needs of the resident firms.
	Percentage of firms	▸ Conduct a survey at park level. ▸ The park operator can implement various programs and outreach activities to help promote partnerships between local businesses and resident firms.
	Percentage of total procurement value of park management entity	▸ Assess the regional satellite activities related to industrial park's procurement strategies. ▸ If the target is not met, the park operator can maximize its existing business partnerships with local companies outside the park or conduct various outreach activities to help promote partnerships between local businesses and resident firms.
	Average percent occupancy rate over 5 years	▸ Conduct technical assessment to check existing ratios regarding rented-out space in the industrial parks. ▸ Park operator can implement various marketing efforts to accelerate the assignment of the parcels to meet the performance target.

Tool 2.5. A data collection form for resource efficiency audit/ assessment

A. General information about the firm	
Name of the firm:	
Name of the facility:	NACE Code and sector:
Address :	Tel:
	Fax:
Contact person:	Occupation/Role:
Year of establishment:	
Occupied area (m^2):	
Number of employees:	

B. Production information

Please fill in the table by annual amounts of production (latest year):

Type/Name of product	Amount	Unit
Total		

IMPORTANT NOTE: Please provide process diagrams of major products as an attachment to this form.

C. Raw materials

Please fill in the table by annual amounts of raw materials (latest year):

Type/Name of raw materials	Related processes	Amount	Unit
	Total		

D. Chemicals and auxiliary materials

Please fill in the table by annual amounts of chemicals and auxiliary materials (latest year):

Type/Name of chemicals and auxiliary materials	Related processes	Amount	Unit
	Total		

E. Energy consumption

Please fill in the table by annual amounts of energy consumption by different sources (latest year):

Energy source	Related processes	Amount	Unit
Coal			
Natural Gas			
Fuel-oil			
Electricity			
LPG			
Renewable (please indicate)			
Other			
	Total (kWh)		

F. Water consumption

Please fill in the table by annual amounts of water consumption by different sources (latest year):

Water source	Related processes	Amount	Unit
Main water (Municipality etc.)			
Groundwater/Surface water			
Other			
	Total (m^3)		

G. Wastewater generation

Please fill in the table by annual amounts/parameters of wastewater by different sources (latest year):

Wastewater source (Processes)	Amount (m^3)	Parameters				
		COD (mg/L)	TSS (mg/L)	Oil and grease (mg/L)	pH	Other
Total						

H. Solid and hazardous waste generation

Please fill in the table by annual amounts of waste generation by different sources (latest year):

Name/Type of waste	Related processes	Amount	Unit
	Total (tons)		

Tool 2.6. Key steps to implement greenfield EIP projects

Assess potential risks and benefits for stakeholders

The successful implementation of a greenfield (or "new") EIP project will depend on capacities to attract firms, location and the proximity to logistic infrastructures, and regional economic development, as well as on the national and local regulatory and political framework. It is important to examine socio-economic and environmental benefits and risks associated with site selection, and raise awareness of these benefits and risks among stakeholders involved in making decisions on investment, planning, development and management of industrial parks (see the table below).

Examples of Benefits and Risks Associated with New EIP Development

Stakeholders	Benefits	Risks
Firms	Industrial park's membership in EIP can help increase sales by marketing it with final clients	Increasing operational risk associated with industrial symbiosis (functional dependency)
	Increasing competitiveness by: i. reducing investment costs (shared infrastructures); ii. reducing running costs through Energy Efficiency and Industrial symbiosis; iii. Reducing costs for regulatory compliance	
	Accessing to subsidized financing	
Local Communities	Increasing employment opportunities in the region	Supporting locations that are in proximity to urban areas
	Cleaner environment compared to conventional Industrial zones	
Government	Setting country excellence	Finding financial resources to support and sustain initial stages of EIP green fields

Site identification and spatial planning

The location of the site is decisive for the economic success of the industrial parks. The attractiveness of the industrial parks depends largely on its geographical location, its direct environment and economic ecosystem such as skilled and available workforce, (local) marketability, infrastructure and networks, existing value chain-related activities, site development and construction costs, flooding or heat wave risks, availability of water, etc. The industrial park's success and its sustainability also depend on its biophysical environment and ecosystem, as well as the principal natural resources that can be affected by industrial park development. In addition, a new EIP can be welcomed by local communities living in its vicinity if it offers jobs and business opportunities, protects their livelihoods, improves local infrastructure and services (e.g. roads, water supply, education and health services), or contributes to a better quality of life in general. However, an industrial park can just as well diminish the quality of life for the surrounding population through the loss of traditional revenue sources (e.g. in agriculture), or causing noise, pollution, health or security problems. Each site under consideration needs to be evaluated considering these factors and evaluation criteria suggested below.

Criteria used for evaluating candidate sites for greenfield EIP projects

	Topic	Sub-topic	Description
Environmental	Climate risk assessment	Vulnerability of the site to climate- related hazards	Understanding climate change impacts of the site and nearby regions, the frequency and intensity of each type of natural disasters, vulnerability and risk assessment, tentative adaptation measures.
	Surface and subsurface waters	Subsurface waters: characteristics (capacities, sensibility and current use)	Existing local or regional subsurface reservoirs used as drinking water sources or for agricultural purposes, existing water protection zones.
		Surface waters: Water flow direction, velocity and volume, hydrology, drainage and flood risks	Existing surface water flow, surface water drainage conditions, evacuation system for drainage waters: infiltration, evaporation efflux.
	Air	Air quality, cumulative effects and sensitivity of neighboring areas to these effects	Air quality near the industrial park: potential cumulative effects or natural environment sensitive to air pollution generated by the industrial parks or areas.
		Sensitivity of the environment regarding the potential noise generation (construction works, industrial activities, traffic)	Sensitivity of the environment regarding an increased level of noise which can be caused by the industrial activities or traffic generated within industrial parks/areas.
	Soil and subsoil	Physical characteristics of the soil and subsoil	Carrying capacity, stability and landslide risks, permeability, erosion.
		Edaphic characteristics: nature and productivity	Risks of losing fertile/irrigated farming soils.
	Environmental sensibility	Flora	Impact on endemic, rare or endangered flora.
		Fauna	Impact on endemic, rare or endangered fauna.
		Soil occupation	Impacts on the nature of soil occupation around the industrial parks/areas.
	Waste	Collection and valorization of ordinary waste	Existing organized waste management systems.
		Connectivity towards a landfill	Existing controlled landfill.
		Collection and treatment of dangerous waste	Existing formal and organized management system for dangerous/industrial waste.
Social	General living conditions	Existing and future housing	Existing housing capacities and future needs; risk of propagation of informal housing
		Existing and future public transport and services	Transport system needs (e.g. capacity and connectivity) and risks of the development of informal systems
	Topic	**Sub-topic**	**Description**

Social	General living conditions	Existing and future amenities and community services	Service needs in general (quantity and quality): restauration, day care, education, vocational training, health, free time activities and administration; risks of the appearance of informal services in the vicinity of the industrial areas.
	Dynamics, opportunities and conflicts	Pressure and social dynamics linked to the soil occupation	Opportunities for valuation or risks of devaluation of land, speculation, etc.
		Potential conflicts with the local population	Potential conflicts with the local population regarding the use of natural resources (e.g. water and soil) or infrastructure (e.g. insufficient roads, installed electric capacities and other equipment).
	Dynamics, opportunities and conflicts	New job opportunities, new sources of revenue and improvement of the living conditions of the local population	Opportunity for local job creation and improved income of local people.
			Percentage of female workforce who benefit from available supporting infrastructure/programs for skills development.
		Revenue losses for the local populations	The population's risk of losing existing revenues due to the development of the industrial parks: usage restrictions for soils (e.g. for agriculture or animal husbandry).
	Security and public order	Presence of security forces	Security situation around the industrial parks.
		Civil protection	Civil protection capacities in case of incidents (fire, toxic emissions, explosions, flooding, earthquake, etc.)
Economic	Connectivity: Costs for access and maintenance	Access to drinking water	Availability in terms of quantity and quality of drinking water and adduction costs.
		Access to electricity	Availability and adduction costs / possibilities for self-supply.
		Access to other networks/ grids	Access to further infrastructure and costs.
		Wastewater network	Construction costs for a wastewater grid, a treatment plant or a link to an existing system /grid.
		ICT	Infrastructure costs for telecommunication grids/systems and maximum bandwidth/ speed (increasing importance in the context of the Internet of Things).
		Roads	Existence of an adequate road network or construction costs for new roads for the needs of the industrial park .
		Port	Distance, transport time, accessibility and needed port characteristics.
		Airport	Distance, transport time, accessibility and needed airport characteristics.
	Terrain constructability	Topography, levelling	Needs and costs for terrain levelling and building ground preparation.
		Flooding	Flood terrains, needing drainage efforts to evacuate/keep the water outside the industrial parks/industrial areas.
	Topic	**Sub-topic**	**Description**

Economic	Existing economic ecosystem	Existing workforce	Availability of (specialized) workforce matching with the industrial park's needs.
		Research and innovation centers	Availability and connectivity of research and innovation centers.
		Business development services	Availability and connectivity of services linked to supporting industrial activities in the industrial parks (e.g. financing, recruitment, HR management, founding enterprises, marketing, organizational development, etc.).
		Existent value chains	Existing branches or single companies linked to the envisaged activities in the industrial park and their potential added value.
		Existing industrial parks or areas (Competition or complementarity)	Existing industrial parks/areas or industrial activities in the proximity which could positively or negatively impact the development of the new industrial parks.
		Shared services and industrial symbioses potential	Existing favorable environment for shared services or industrial symbiosis (energy, waste valorization, waste management, water treatment, etc.).
		Change of land use: local effects and absorption of the resulting costs	Potential housing development, formal and informal activities and respective infrastructure needs (e.g. social or transport infrastructure), need for restructuring/ upgrading of existing infrastructure, including construction and maintenance costs.

Marketing

Marketing is one of the most important aspects to attract firms to develop new EIPs. For the success of a greenfield (or "new") EIP project, it is essential to attract firms by identifying various opportunities for firms to increase their competitiveness and differentiation in their markets. Park developers need to describe and demonstrate to the firms the benefits associated with improved cost efficiency, which will affect both initial investments and operating costs, and to differentiation in their market due to a sustainable approach to business. This last topic is going to be a significant parameter in the evaluation of vendors performed by international buyers. Potential actions that practitioners can use to promote benefits for firms in the EIPs include:

- Organizing workshops and round tables on economic benefits associated to sustainable growth, energy efficiency and industrial symbiosis
- Promoting R&D projects for energy efficiency, recycling and waste reduction
- Promoting annual awards for firms standing out in terms of their achievements of economic performances driven by overperforming EIP's indexes

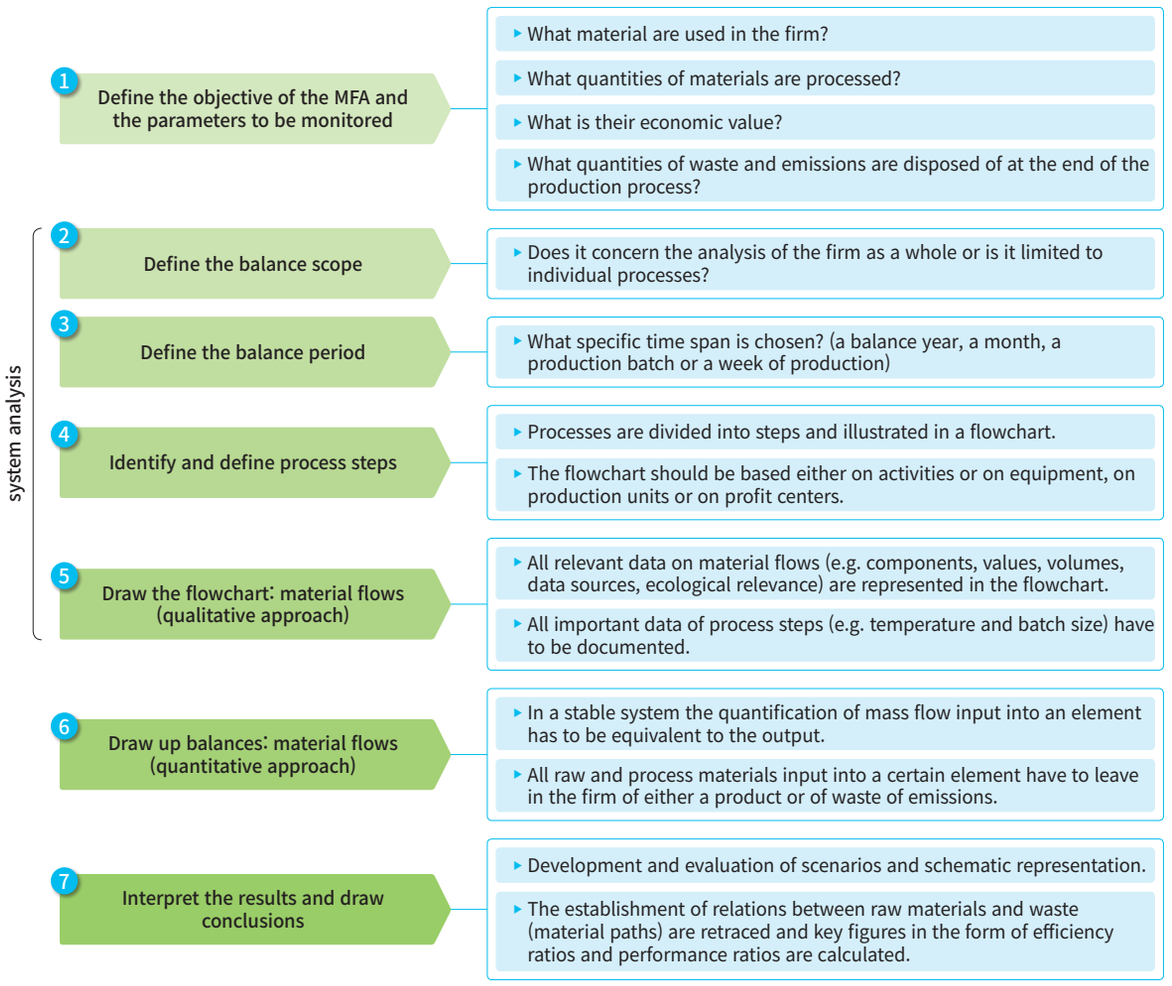
Tools for implementing the Handbook Section 3: EIPs and industrial symbiosis

Tool 3.1. Material Flow Analysis (MFA)

Material flow analysis (MFA) is a tool that visualizes material and energy flows used in a firm such as the source of raw and processed materials, as well as the volumes and sources of waste generation and emissions. MFA is used in creating a database on the inputs (e.g. raw material use, water, and energy demands) and outputs (e.g. wastes, by-products and waste heat) from firms within and outside industrial parks. MFA facilitates rapid and easy interpretation of the collected information. In addition, MFA helps analyze the composition of the used substances and assess their economic values, allowing firms and the park operators to ensure efficient production and use of materials and to identify potential industrial symbiosis among firms within/outside industrial parks.

Several types of charts can be used for conducting an MFA. These include flowcharts illustrating material flows and process steps; pie charts and histograms describing ratios and compositions; time-travel diagrams indicating time relations; and Sankey diagrams representing material flows true to scale. Practitioners can conduct an MFA using these charts and following steps described in the steps below.

Steps to conduct an MFA analysis



Tool 3.2. A data gathering form to be used for identifying potentials for industrial symbiosis

Information about resident firm

Means of communication:	☐ Phone call	☐ Site visit	☐ Other
Date and time of meeting:		**Reporter:**	
Representatives of the firm and their roles:			

Name of the firm:			
Address:			
Type and amount of products:			
Sector code: (NACE, ISIC etc.)		**# of employees**	
Parent company:		**Date of establishment**	
Contact person:			
Fax:			
Additional info:			

Resources/Waste generated and available from the firm

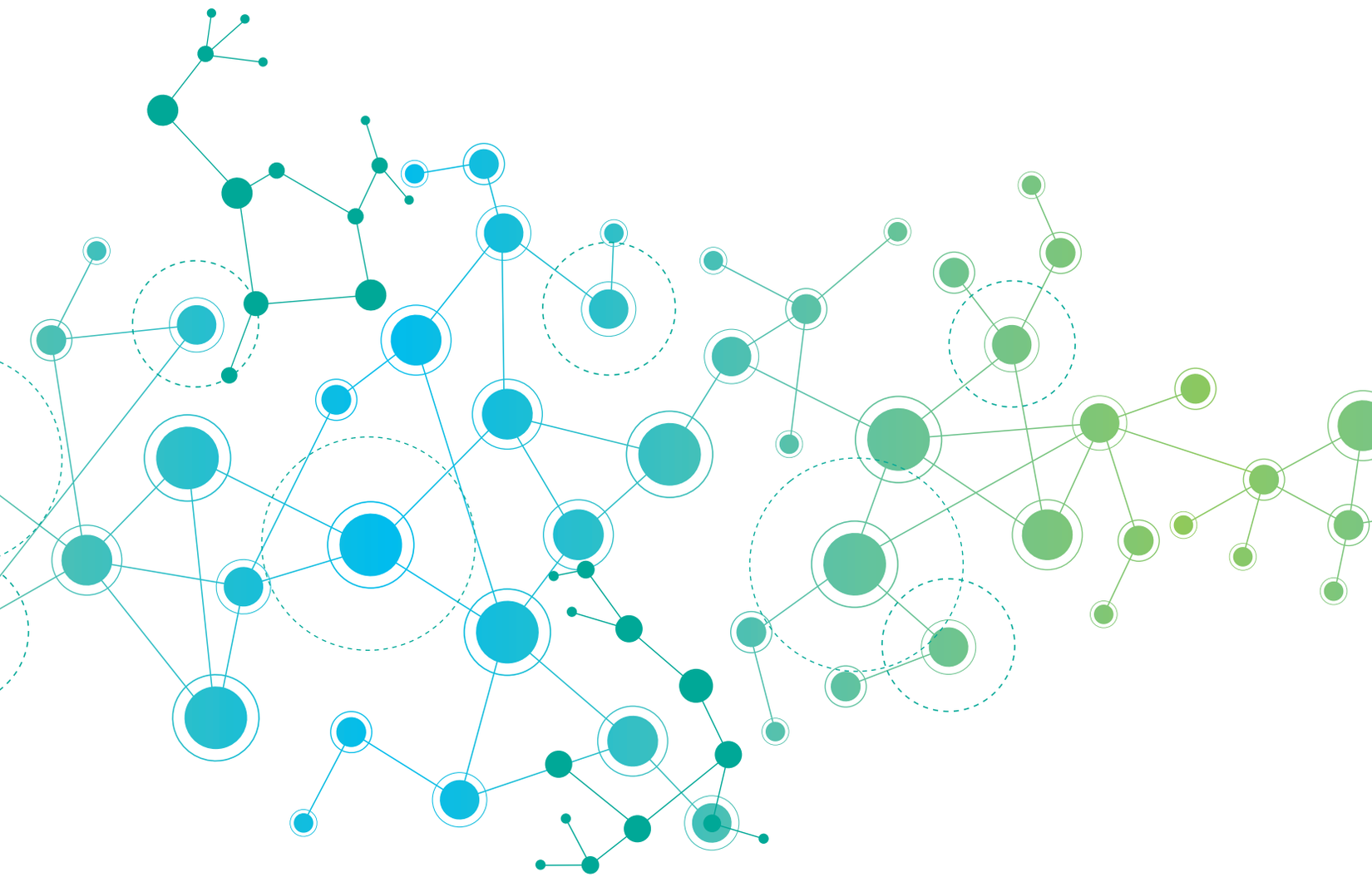
Resources/Waste	**Detailed information** (amount, type, the content of the resources/ waste, the process through which resources/ waste are generated, the frequency of generation etc.)	**Waste code** (European Waste Codes (EWC) or a similar waste coding system)
Solid wastes (metal, wood, packaging, ash, plastics, etc.)		
Chemicals (Solvents, acids, alkaline, etc.)		
Electric/Electronic equipment (Batteries, cables, chips, mobile communication devices etc.)		
Waste biomass (Food wastes, agricultural wastes, agroindustry wastes etc.)		
Liquid resources (Process water, wastewater, oil, sludge etc.)		
Gases (CO_2, methane etc.)		
Energy (Steam, waste heat, fuel etc.)		
Transportation (excess capacity for transportation etc.)		
Facilities (warehouses, depots, wastewater treatment facility, laboratories etc.)		
Other (expertise, competency, information etc.)		

Notes:

Resources and Waste the Resident Firms Can Receive

Resources/Waste	Detailed information (amount, type, the content of the resources/ waste, the process through which resources/ waste are generated, the frequency of generation etc.)	Waste code (European Waste Codes (EWC) or a similar waste coding system)
Solid wastes (metal, wood, packaging, ash, plastics, etc.)		
Chemicals (Solvents, acids, alkaline, etc.)		
Electric/Electronic equipment (Batteries, cables, chips, mobile communication devices etc.)		
Waste biomass (Food wastes, agricultural wastes, agroindustry wastes etc.)		
Liquid resources (Process water, wastewater, oil, sludge etc.)		
Gases (CO_2, methane etc.)		
Energy (Steam, waste heat, fuel etc.)		
Transportation (excess capacity for transportation etc.)		
Facilities (warehouses, depots, wastewater treatment facility, laboratories etc.)		
Other (expertise, competency, information etc.)		

Notes:



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