SESSION 2

Eco-Industrial Parks

7th October 2020 (Wednesday)
9:00am-10:30am (EDT)
Expected Takeaways

1. Link between circular economy and eco-industrial parks
2. Overview on the eco-industrial park framework
3. Enabling eco-industrial parks at national and park level
Circular economy is an “industrial economy”

Returns products, parts and materials into use several times

Based on principles that
• Products are designed to last
• Value is maintained for as long as possible
• Generation of waste and pollution is minimized
• Renewable energy is used along value chains, as much as possible

Enablers: Innovation, Stewardship, Partnership and Collaboration between businesses, governments, and consumers along value chains
Along global and domestic value chains
• Eliminate/replace the product (→ single-use plastics)
• Design phase
  o Reduce amount of materials used
  o Eliminate/replace hazardous chemicals
  o Improve Durability / Reusability / Upgradability / Reparability / Recyclability
  o Increase recycled content in products
  o Products to use energy, other resources efficiently
• Maximize resource efficiency in manufacturing
• Optimize/intensify use of products
• Enable remanufacturing
• Regenerate biomass, recycle materials
• After maximizing circularity everywhere else, recover energy from remaining waste
An EIP is a breeding ground for circular economy practices

EIPs facilitate urban-industrial symbiosis on energy recovery from waste (e.g. heat and cooling districts)

Organics-based firms in EIPs benefit from utility, by-product, supply chain, service synergies with other firms in the park for regeneration of biomass

Resource efficient and cleaner production (RECP) and industrial synergies reduce resource use and waste from design to manufacturing

Recycling facilities operating within EIPs create synergies with other firms

Management entity of an EIP provides circular economy services to its tenant firms (e.g. R&D, maintenance, centralised waste collection, reuse and recycling)

EIPs provide testing ground for new circular economy enabling technologies and businesses for reuse, remanufacturing, intensifying product use

→Material supply →Design and manufacturing →Distribution and →End-of-first use
Key benefits of eco-industrial parks

When comparing an EIP to a traditional industrial park the main differences are in the following key benefits:

- Improved competitiveness and profitability
- Creation of good-quality jobs
- Improved workers health and safety
- Increased quality of life for communities
- Better access to new technologies and finances

- Reduced use of raw materials, water, energy and chemicals
- Reduced waste through resource circularity
- Minimized greenhouse gas emissions and release of pollutants
- Reduced environmental, economic and social risks
Towards an International Framework for EIPs

1. An International framework for EIPs (2017 v.1; 2020 v.2*)
   • Attempt to create a standardized framework that can be implemented globally (applicable to both developed & developing countries).
   • Collaborative initiative of the World Bank Group (WBG), United Nations Industrial Development Organization (UNIDO) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
   *The new release of the International Framework for EIPs is expected by December 2020
   
   https://openknowledge.worldbank.org/handle/10986/29110

   • Provide a step-by-step guide on how to operationalize the framework, including on (1) how to develop a national approach for EIPs and (2) how to implement the approach (3) creating and managing industrial symbiosis networks.
   • Collaborative work from WBG, UNIDO, GIZ, and Ministry of Trade, Industry and Energy of the Republic of Korea (MOTIE).
   
   https://openknowledge.worldbank.org/handle/10986/30458
Overall framework for eco-industrial parks

Baseline: Compliance with local and national regulations

- Prerequisites (basic requirements)
- Performance indicators (expected performance levels)
### Examples of EIP requirements

<table>
<thead>
<tr>
<th>Park management</th>
<th>Environment</th>
<th>Social</th>
<th>Economic</th>
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</thead>
<tbody>
<tr>
<td>Park management entity</td>
<td>A distinct park management entity (or agency, where applicable) exits to handle park planning, operations and management, and monitoring. [yes/no]</td>
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<tr>
<td>Park management empowerment</td>
<td>Proportion of firms in the industrial park to have signed a residency contract/park charter/code of conduct that empower the park management entity to perform its responsibilities and tasks, and charge fees for common services. Percentage of firms [100%]</td>
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<tr>
<td>Waste: Resource conservation</td>
<td>Obeying the principles of circular economy is part of the Park’s Code of Conduct, and any legally binding agreement between tenant firms and the park authority. [yes/no]</td>
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<tr>
<td>Resource conservation</td>
<td>Proportion of manufacturing firms adopting circular economy practices, including engagement in Industrial Symbiosis Networks in the park; or actively exchanging secondary raw materials, or waste, or other circular economy practices. Percentage of tenant firms participating in CE practices [20%]</td>
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<tr>
<td>Social management system</td>
<td>Dedicated personnel exist (as part of the park management entity) to plan, manage and enforce social quality standards. [yes/no]</td>
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<tr>
<td>OH&amp;S management system</td>
<td>Proportion of all firms in the industrial park with more than 250 employees that have a well-functioning OH&amp;S management system in place. Percentage of firms [75%]</td>
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<tr>
<td>SME development</td>
<td>Park management entity allows and promotes the establishment of SMEs that provide services and add value to park residents. [yes/no]</td>
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<td>Local value added</td>
<td>Proportion of resident firms using local SME suppliers or service providers for at least 25 percent of their total procurement value. Percentage of firms [25%]</td>
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Barriers and enablers to the implementation of a national EIP framework

**AT NATIONAL LEVEL**

- Stakeholders’ engagement
- National Framework
- Institutional capability for monitoring
- Rules & Regulations
- Financing mechanisms

**AT PARK LEVEL**

- Eco-Industrial Parks

**Demand from investors:**
- Environmental compliance
- High quality services and low fees

**Potential strategies:**
- Invest in smart and efficient common infrastructures
- Shift from real estate operator to a more complex service provider, diversifying service offer
- Support industrial symbiosis networks

**Capital cost/ Innovative financial arrangements**

**Operational cost/ Specialized professional**

**Lack of trust among firms/ New role of the park operator as facilitator**

- Insufficient financial returns on sustainable investments
  Sustain R&D, innovation, new technologies to reduce capital/operational costs
- Lack of appropriate regulations
  New policies to support the adoption of new business models, to allow the exchange of material among tenant firms and sustain the creation of partnerships
- Lack of awareness and information sharing
  Map main stakeholders and create events to foster their engagement
- Limited enforcement of existing or new regulations
  Improve institutional capacity, strengthening skill and competencies
## How to Develop a National EIP Framework

### AT NATIONAL LEVEL

<table>
<thead>
<tr>
<th>Steps</th>
<th>Activities</th>
<th>Responsible entities</th>
</tr>
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</table>
| 1. Engage stakeholders and secure commitment | - Map and categorize stakeholders.  
- Align EIP goals with national policy goals and secure commitment.  
- Develop capacity-building and awareness-raising activities.  
- Engage stakeholders throughout the EIP policy development process. | National and regional government regulators in partnership with regional and local authorities, research institutions, academia, and coordinating agencies. |
| 2. Diagnostics | - Select sample industrial parks to conduct technical analysis.  
- Conduct technical analysis.  
- Conduct policy and regulatory analysis.  
- Conduct institutional analysis.  
- Analyze financial needs. | National and regional government regulators in partnership with Ministries, park operators, resident firms, banks, and so on.  
Park management unit in association with park operators and resident firms.  
Ministries, park operators, firms and banks. |
| 3. Develop a national EIP roadmap | - Conduct policy and regulatory reform.  
- Establish governance structure and coordinating agencies.  
- Determine financing mechanisms. | National government regulators, in partnership with relevant stakeholders. |
| 4. Launch, monitor and evaluate | - Monitor, evaluate and verify.  
- Scale up and mainstream the EIP. | National government regulators, in partnership with coordinating agencies, and regional/local entities. |

### AT PARK LEVEL

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| 1. Upgrade Service and infrastructure | - Conduct a preliminary assessment to apply the International EIP Framework  
- Conduct a pre-feasibility assessment and secure the commitment of stakeholders  
- Develop a park-level action plan | Park operators, coordinating agencies, park/firm level representatives, and local governments |
| 2. Establish an EIP management team | - Assess the needs for an EIP management team and human resources  
- Roles and responsibilities of the EIP management team  
- Functions of EIP management | Local government, and EIP management team |
| 3. Performance audits | - Establish an internal audit system  
- Monitor and evaluate the performance of EIP programs taking place within the park | EIP management team |
| 4. Reporting and marketing | - Build business cases | EIP management team in partnership with park- and firm-level representatives |
Innovative technologies and digitalization to enable resource efficiency, circularity and competitiveness

- **Green energy technology**
  - Ground-mounted / floating solar panels in industrial parks
  - micro-grid, battery storage/ energy storage system and factory EMS
  - Solar water heating/ centralized heating/ cooling technologies
  - Biomass / biogas plants
  - Energy efficient / smart factory/ green buildings, industry zone facilities, warehouses

- **Energy, Water and material recovery**
  - Waste-heat recovery and steam generation
  - Reuse of sludge to produce energy/biomaterial, recovery of biogas and reuse of treated wastewater generated from CETP
  - Industrial symbiosis
  - CO2 recovery and reuse for industrial processes

- **Sharing platforms**: material exchange, energy exchange, knowledge and technologies, offer of underused assets, production sharing, by product offer to third parties outside the park
THANK YOU!

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