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MAKING STATE CIRCULAR ECONOMY PARKS WORK FOR THE INDIAN STATES (PART 1): AN EMERGING STORY OF RAJASTHAN

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EXECUTIVE **SUMMARY**

The concept of Eco-Industrial Parks (EIPs) is analogous to an ecological system, i.e., where different systems organically interact with each other (Gibbs & Deutz, 2005), and the by-products of one case will become the feedstock of another (Elabras Veiga & Magrini, 2009). Thus, EIPs are a mix of both industrial ecology and cleaner production, where the waste of one is input to the other. As a result, there is zero production of waste making the process more environmentally friendly. However, the success of developing such industrial parks is mainly dependent on the emergence of innovative network governance that enable different companies to find common ground and find ways to reuse and recycle industrial by-products (Mathews et al., 2018).

Given this background, the working paper intends to analyse the concept of industrial parks and their suitability in the management of e-waste in India. As the working paper reveals, the development of EIPs in India is still at a very nascent stage, and going ahead, a lot of progress is needed.

Transitioning from EIPs to E-waste Recycling Parks (ERPs) in India

India is one of the largest e-waste producers in the world. According to the data provided by the Central Pollution Control Board (CPCB), the estimated e-waste generation from 21 types of notified e-waste raised from 7,08,445 tonnes in 2017-18 to 10,14,961 in 2019-20 (CPCB, 2021). The quantity of e-waste recycled and dismantled during these years were 69,414 tonnes and 2,22,436 tonnes, respectively (CPCB, 2021). However, there is a lack of consistency in various data sources regarding the total amount of recycled waste, with reported recycling rates ranging from as low as 2 percent to a maximum of 22 percent (Awasthi et al., 2018; CPCB, 2021; Garg & Adhana, 2019). In addition to the formal sector, the informal sector also plays an important role in e-waste recycling.

The lagging development of the recycling sector is primarily due to the perception of waste as an

externality rather than a business opportunity. This perception has led to fewer recyclers entering the market despite its economic potential (Jain & Gidwani, 2023). However, the conventional portrayal of 'waste' as 'throwaway' is changing, revealing it as a growing business opportunity (Jain & Gidwani, 2023). As the market expands and the social stigma around waste diminishes, many entrepreneurs and larger businesses are gradually venturing into the sector. In light of this, we argue for promoting 'e-waste as a commodity.'

One obstacle to the organic development of e-waste recycling is the limitation of environmental governance. India was one of the few countries to introduce rules to distinguish e-waste from other waste back in 2011, which was later updated in 2016 and then in 2022. The latest rules emphasize the introduction of Extended Producer Responsibility (EPR), where producers are responsible for the ultimate disposal of their waste. Additionally, a significant amount of waste is collected and recycled by the informal sector, making it more challenging for the formal sector to collect waste in significant quantities. While some progress has been made in establishing a governance framework, much work is needed in areas such as improving collection and optimizing waste flows. To address this problem, traditional e-waste management strategies, which are often technologically inefficient, should be replaced with more effective alternatives (Ikhlayel, 2018).

The required efficiencies can be gained with the implementation of the concept of inclusive and sustainable business parks. Industrial parks have been in the news recently mainly because of the alarming concern of climate change, environmental degradation and the rising need for business models based on green growth and a circular economy (UNIDO, 2017). Two typical industrial parks, Tianjin Economic-technological Development Area (TEDA) and Qingyuan City Waste Disposal & Resource Utilisation Centre, have proved extremely efficient in dealing with waste. While waste management is the primary role of such established parks, it also has other positive spill overs, like generating jobs and economic growth.

The literature highlights the role of EIPs in various sectors, addressing the escalating issue of e-waste generation and the necessity of recycling. Building on this concept, we propose the idea of 'E-Waste Recycling Parks' (ERPs), derived from the concept of 'industrial symbiosis' in the context of e-waste management (UNIDO, 2017). ERPs can address the existing problems of e-waste management in multiple ways:

1. The symbiotic relationship of different types of e-waste under a single roof will make the recycling process more environmentally friendly and help achieve the zero-waste target.

2. ERPs will make the recycling process cost-effective through infrastructural cost-sharing, reducing transportation costs, and establishing inter-industrial linkages.

3. As e-waste consists of diverse materials, according to Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB) reporting, standalone recycling of each item may not be economically viable. However, establishing ERPs can facilitate collective recycling.

4. ERPs can stimulate regional economic development by creating new jobs, localizing production and consumption, and promoting collaboration between the formal and informal sectors.

5. ERPs have the potential to encourage industry recycling by introducing state-of-the-art technology and incentivizing private sector participation in the recycling business.

Additionally, the co-location of recyclers can foster technological innovations, mutual learning, and can be used to create public awareness and build capacity.

Preparatory Analysis for the Establishment of ERPs

However, setting up of EIPs in reality might be a challenge for many states. The paper describes five factors critical to the development of ERPs in India that states may look into.

The proposed framework under the analysis distinguishes between five phases: understanding the demand for ERPs, reviewing the existing legislative and regulatory frameworks, financing the ERPs, operationalising ERPs, and post-establishment monitoring (see table 1).

Table -1 Steps for Establishing ERPs

S.N.	Factors to Consider	Details
1	Understanding the demand for ERP	• Mapping the existing e-waste inflow and outflow network and recycling value chain. • Calculating the existing quantum of e-waste generated in the state where the park is located and also the adjoining regions. • Estimating the quantum of waste that will be generated in the near future. • Understanding the gap between the installed e-waste recycling capacity and required capacity. • Identifying the existing stakeholders involved with the e-waste recycling loop.
2	Reviewing of the legislative, administrative and regulatory frameworks	• Reviewing the existing legislations that deal with e-waste management and handling (i.e., E-waste Management and Handling Rules, Battery Waste Management Rules), including regulations for land acquisition. • Reviewing the existing policy guidelines that indirectly deal with the e-waste generation and management (i.e., National Policy on Electronics, National Telecom Policy, Faster Adoption and Manufacturing of Hybrid and Electric Vehicles, State level EV policies, Battery Swapping Policy). • Analysing the existing regulatory framework that promote spatial economic development (e.g., industrial park, special economic zones, export processing zones, industrial clusters etc.). • Identifying the suitable location for establishing ERP through locational analysis. • Conducting the feasibility study for establishing the ERP. • Preparing the master plan for the establishment of ERP, which could be undertaken in two steps, i.e., (a) conceptual master planning (including activities and broad layout of the park), and (b) planning and preparation of a detailed project report[1].
3	Financing the ERP	• Reviewing the existent public revenue streams available for financing green growth on a national level (i.e., budgetary allocation at the central level, Gati Shakti scheme, Production Linked Incentives scheme) needed for the development of ERP • State-level public revenue streams and incentive schemes. • Loans from public and private sector banks. • Alternative financing sources (e.g., International Finance Corporation, Green Bonds, Carbon Credits).
4	Operationalising the ERP	• Reviewing the existing land-related legislations (i.e., land acquisition/pooling act, land disposal Act) to make land available for ERP. • Allotment of land for establishing ERP through public notification. • Identifying/setting-up the authority responsible for the establishment of ERP. • Provision of infrastructural and administrative services to the ERP. • Examination of project suitability based on the submitted proposal and identification of best available technology for e-waste recycling by a technical committee in consultation with by entrepreneurs. • Streamlining the application procedure by implementing single-window clearances. • Preparing a standard operating procedure for smooth functioning of the park and identify common facilities required for facilitating recyclers. • Deciding on the governance models of the park, i.e., private, government, cooperative model like public-private partnership (PPP).
5	Post-establishment mentoring	• In the early phases, handholding and troubleshooting is an important factor for the success of the park. • Efforts should be made to integrate local informal waste channels into the formal ones to ensure adequate supplies of raw materials to entrepreneurs locating their plants in the park. • Monitoring of the local environmental factors after the establishment of the park to safeguard the local environment. • Monitoring the social considerations for the proposed ERPs.

1 A detailed project report contains a thorough breakdown of all the components required to complete the project.

State of Progress in Rajasthan

Rajasthan is one of the earliest states to further the concept of industrial parks to explore waste as a commodity. In order to increase e-waste recycling capacity within the state Rajasthan government is planning to establish a recycling park in Jaipur. According to the state E-waste disposal (draft) policy 2022, the recycling park will put together e-waste recyclers alongside of other types of waste recyclers, including end-of-life vehicles (ELV), batteries, plastic and other hazardous waste. It will help the state government to promote circular economy and facilitate the private actors to set up recycling plants that use state-of-art technology in recycling e-waste. The location for the recycling park in Jaipur has been decided while considering multiple factors such as proximity to the Delhi NCR region, robust road connectivity, and availability of public land. Given this context, the paper takes a closer look at the state of Rajasthan and the development of waste recycling park, on the lines of the framework discussed above.