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EPR and Circular Economy Paper Series

Toward a Circular Economy: Strengthening Extended Producer Responsibility (EPR) through High-quality Recycling

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Extended Producer Responsibility (EPR) has emerged as one of the preferred policy instruments for addressing the environmental challenges caused by unsustainable resource consumption and inefficient waste management. EPR shifts responsibility for a product's environmental impact from consumers and governments to producers. This promotes a transition away from the traditional linear economy of "take, make, dispose" toward a circular economy, where resource use is reduced and reused, recycled, and reintegrated into production cycles. By holding producers accountable for the lifecycle of their products, EPR incentivises sustainable practices such as using recycled materials instead of virgin resources in manufacturing.

While EPR has achieved notable success in improving waste collection rates, it has fallen short in catalysing the use of recycled or secondary raw materials in manufacturing. This gap reveals systemic barriers that must be addressed to fully realise the potential of a circular economy.

Key barriers to the use of recycled materials

The limited uptake of recycled materials in manufacturing stems from several interconnected challenges:

1. **Fragmented EPR Systems:** Differences in collection systems, recycling standards, and regulations across jurisdictions complicate the integration of recycled materials into global supply chains.
2. **Inadequate High-Quality Recycling Infrastructure:** Many regions lack the facilities needed to process diverse and complex waste streams at scale that is also financially viable.
3. **Lack of Harmonised Standards:** The lack of uniform standards for dismantling, recycling, and material specifications means lot of recycled material may not meet technical material requirements, which hinders the adoption of recycled content
4. **Variability in Recycling Inputs:** Recycling plants process a wide mix of products, brands, and models, resulting in variability that hinders consistent output quality.
5. **Technical Limitations of Recycled Materials:** Manufacturing processes often require raw materials with precise. Recycled materials often fail to meet technical specifications required in manufacturing processes leading to their lower-grade (downcycling) applications.
6. **Unpredictable Supply of Secondary Materials:** The supply of high-quality secondary materials is inconsistent, deterring manufacturers from relying on recycled inputs, often unfavourably impacting their costs.
7. **Low Market Demand:** Manufacturers often perceive recycled materials due as inferior, and consumer demand for products with recycled content remains limited.
8. **Missing Purchase Agreements:** Manufacturers rarely enter long-term purchase agreements for recycled materials, creating uncertainty in the supply-chain and discouraging investment in recycling infrastructure.

Solutions to enable high-quality recycling

For EPR to succeed in closing the material loop, significant improvements in recycling infrastructure and practices are essential. High-quality recycling requires coordinated action on multiple fronts:

a) Invest in Advanced Recycling Infrastructure

High-quality recycling requires significant investment in advanced technologies, processing capacity, and skilled labour. Governments and industry should collaborate to support these investments through subsidies, tax incentives, and public-private partnerships. Ensuring operational viability is critical, plants must process large volumes to be cost-effective and sustainable.

b) Stimulate Market Demand for Recycled Content

Introduce requirements for recycled content alongside raising public awareness and introducing eco-labelling that can help consumers make informed choices and generate demand for sustainable products, encouraging manufacturers to prioritise recycled materials.

c) Secure Consistent Feedstock Supply

Recycling is inherently collection dependent. This requires the establishment of robust collection systems, supported by public or private sector initiatives, to ensure a reliable flow of feedstock. EPR is crucial in organising and financing these collection systems.

d) Standardise Recycling Processes

Harmonised protocols for collection, sorting, de-pollution, and processing improve the quality and predictability of recycled outputs. International standards and certification systems can increase trust in recycled materials.

e) Promote Technological Innovations for Complex Materials

Advanced technologies, such as AI-powered sorting systems and chemical recycling, are essential to recover high-value materials like rare earths and composite plastics. Ongoing R&D is vital for improving material recovery from complex waste streams.

f) Remove Toxic Constituents Safely

E-waste and other waste types often contain hazardous substances like lead, mercury, and brominated flame retardants. Recycling systems must include effective decontamination processes to ensure recovered materials are safe and compliant with health and environmental regulations.

g) Reform Government Disposal Practices and Procurement Policies

Public institutions often auction off waste to the highest bidder, which can lead to environmentally unsound recycling practices in the informal sector. Governments should commit to sending waste exclusively to certified, high-quality recyclers. Public sector manufacturing units should also sign offtake agreements with recycling facilities, helping to establish a stable market for secondary materials and attract private investment.

Conclusion

High-quality recycling is both an environmental necessity and an economic opportunity. Recycled materials that meet technical standards can be reliable and cost-effective for manufacturers. Advanced technologies can recover critical materials, while effective detoxification can safeguard health and the environment.

Significant investments are required in recycling technology and infrastructure. Governments should lead with supportive policies including standards for recycling and use of recycled content, and necessary investment in infrastructure and innovation. Governments should also steward EPR frameworks, and coordinate industry and consumers that can drive circular practices and uptake of recycled materials. Industries should adopt circular practices and increase the use of recycled materials. Consumers should demand eco-friendly products and participate actively in recycling programs.

Only through coordinated and cross-sectoral action can EPR achieve its long-term goals of enabling material circularity, reducing environmental impacts, and fostering a sustainable future.

Series Overview

This paper is part of a short-paper series developed under the Technical Advisory on Strengthening EPR in Asia, with the objective of advancing the circular economy. Each paper focuses on a specific issue related to EPR and the circular economy—such as product design, cross-regional learnings, high-quality recycling, cost of EPR compliance, prioritization of sectors, collection channels, and the inclusion of the informal sector in EPR systems. The purpose of these papers is to provide policymakers and advocates with concise, actionable guidance that can serve as a starting point for more detailed analysis and in-depth exploration.

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