

EPR Modalities & Circular Economy: Understanding the Challenge & Suggestive Measures

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Abstract: *E-waste Management has been a new growing environmental challenge amongst various sources of Pollution, owing to its intractability after entering market, lack of awareness, strong foothold of Informal sector in e- waste collection & disposal using rudimentary technologies for recovery of useful metals while leaving to nature, the unrecovered precious and rare metals besides other hazardous Components. E-waste may be compared to a silent but potent environmental pollutant, as discharge of toxic metal components / gases / liquids, viz., compressor oils etc. can damage the air, water & soil simultaneously, if not handled in scientific manner.*

Keywords: EEE, E- Waste, EPR, Circular Economy.

1. Introduction

EEE (Electrical & Electronics Equipment) has become an essential and indispensable part of everyday life. Its availability & widespread usage have enabled much of the global population to benefit for higher standard of living. However, the way in which we produce, consume and dispose of e- waste is unsustainable. Because of ever rising demand for advanced Electronic equipments, and increased rates of consumption and disposal, there is pressure on resources, the emission of GHGs & release of toxic substance during informal recycling produces are on the rise consequently, leading to considerable environmental & human health risks of inadequately management waste EEE.

1.1 Source of Revenue Generation

E- waste is not a waste but treasure. E-waste is hazardous only, if disposed of in an unscientific manner, and is otherwise a wonderful resource with very high revenue generating potential, owing to presence of precious metals like Gold, Copper, Silver, Bronze, Brass and Lead etc.

But, approx. 80 % of this resource remains untapped & ends up in landfills as it is mostly handled by informal sector having crude technologies available with them.

Recycling of e- waste is imperative to bridge the gap between production recovery to ensure Circular Economy. It will loosen the ever mounting pressure on mining & demand for raw materials automatically.

1.2 Global E-waste Flows

An Overview: In 2019, the world generated 53.6 MT of e-waste, an average of 7.3 Kg per capita. E-waste generation is expected to increase by an average of 2 MT annually to 74.7 MT in 2030 (Forti. etal 2020 a) and as much as 110 MT is expected in 2050 (C.P. Balde & Co. 2022a).

Out of 53.6 MT, only 9.3 MT (17.4%) of E- waste has been documented to be environmentally soundly managed, 5.1 MT (9.5 %) of global e-waste generation corresponds to total transboundary movement of used EEE or e- waste, While rest of 44.3 MT of e- waste remains undocumented, having approx. value of raw materials @ \$ 47.6 billion USD (Forti. etal 2020 b).

In Asia 2.9 MT of total **24.9 MT** e-waste generated is documented as being treated in environmentally sound facilities. The informal sector has a strong presence in all areas except for high income countries. Further, in Southern Asia (India, Iran and Pakistan), imports & exports of e-waste is very less - only 0.2 MT are exported & 0.3 MT are imported and total waste generation in areas is **4.8 MT**. (C.P Balde & co., 2022b).

Thus, recycling activities are not keeping pace with the global growth of e- waste.

Statistics show that in 2019, the continent with highest collection & recycling rate was in Europe with 42.5 %, Asia ranked second at 11.7 %, the Americas & Oceans were similar at 9.4 % and 8.8 % respectively & Africa had lowest rate at 0.9% (Forti et.al.,2020c).

1.3 Present status of India in e-waste Management:

India has emerged as 3rd largest generator of E- waste with 3.2 Million tons of waste generation in 2019 with year on year growth rate of 18 % (Forti et.al.,2020d).

As per latest Report submitted by Union Govt. of India, E waste generation in Country was 16.01 lac MT in 2021-22 of which merely one- third (5.27 lac MT) was collected & processed. Haryana Ranks first in e- waste collection and processing in the country (Times of India, August 10, 2023) while Gujarat ranks at 6th Number.

As on 08-06-2023, there were 569 No. of Recyclers registered with CPCB (cpcb.nic.in) having installed capacity of 17.9 Lac MT.

Country has notified new E-waste (Management) Rules, 2022 in Nov, 2022, which are effective since 1st April 2023. These Rules aim to ensure the environmentally sound handling of e- waste and establish improved EPR regime for e- waste recycling. Rules set target for consumer goods companies & makers of electronics goods to ensure that at least 60 % of their E- waste is collected & recycled by 2023 with targets to increase them to 70 % and 80 % in 2024 & 2025 respectively.

1.4 Circular Economy

A circular Economy is a system in which there shall be laid stress on maintaining highest value of all materials & components at all times, that is opposite of linear economy.

Circular Economy for E-waste focusses on

- Designing EEE to ensure durability, reuse & safe recycling by replacing components of concern by substitutes.
- Advanced Recycling & Recapture by formal sector followed by integration of recycled contents into new products.
- Repair, enhancing life of discarded / reusable items.
- Increased rate of e- waste collection & return with incentives for Consumers.
- Maximizing urban mining to raise the amount of valuable e- waste that moves back into the production of new electronic products and components.

The Earth's richest deposits of valuable materials are sitting in landfill sites or people's homes. There is 100 times more gold in a tonne of smart phones than in one tonne of gold ore (PACE & World Economic Forum Report, 2019).

- Implementation of a highly efficient and economical reverse supply chain model that is safe and responsible, and ensures that materials do not flow into the informal sector.

1.5 Potential of E- waste in Circular Economy

EEE have a complex material design, comprising of up to 69 elements from the periodic table including precious metals (e.g. gold, silver, copper, platinum, palladium ruthenium, rhodium, iridium and osmium), Critical Raw Materials (CRM), e.g Cobalt, Palladium, indium, germanium, bismuth & antimony) & non- critical metals such as aluminium and iron (Forti et.al., 2020e).

Within the Paradigm of a circular economy, the mine of e-waste should be considered as important source of secondary raw materials and in view of rise in demand of EEE confronted with material scarcity, availability & access to resources, it is imperative to improve recycling of e- waste so that Countries can mitigate their material demand in a secure & sustainability way.

By improving e waste collection and recycling practices worldwide, a considerable amount of secondary raw

materials could be made readily available to re-enter the manufacturing process while reducing the continuous extraction of new materials.

1.6 Steps taken by United Nations Environment Management Group:

- To tackle issue of e- waste Management in a sustainable manner, UN has engaged in over 150 Projects, Publications, Reports & Programmes since the year 2004.
- **The E- waste Coalition** : In March 2018, a non binding **Letter of Intent** was signed by seven organisations followed by three more organisations in 2019, viz, International Telecommunications Union, United Nations University, United Nations Industries Development Organisation, UN Environmental Programme, the Secretariat of the Basel, Rotterdam and Stockholm conventions, International Labour Organisation, UN Human Settlements Programme, International Trade Centre, UN Institute for Training & Research & the World Health Organisation with three core functions, viz., Advocacy, Knowledge and Interventions.

2. Suggestive Measures to achieve objectives of Circular Economy:

- **Re- Evaluate:** If we really need a EEE while Preparing to purchase it.
- **Repair** as much as possible till it is declared **Beyond Economy Repairs**.
- Prefer to buy Environmental friendly Electronics.
- Prefer to **donate** used Electronics to maximize their use till the device reaches end of life and gets obsolete.
- Prefer to **reuse** large Electrical & Electronic equipments.
- **Dematerialization** (E-waste as a service) shall be vital to ensure that the product is used till last & repaired for longevity.
e.g: In Netherlands, **Signify (Philips)** sells lighting as a service & in the UK, **Rolls Royce** sells aeroplane engine time rather than jet engine (PACE & World Economic Forum Report, 2019).

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Author Profile



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