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Building A Facilitative Ecosystem For Circularity!

THE EDITOR'S NOTE

Dear Readers Greetings!



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In the recent years, as a matter of urgency and economic imperative, the emerging global discourse on sustainability has pushed the agenda of circularity at the forefront. Infact, the recently concluded G20 summit and CoP28 summit have also reiterated the need for a collective and collaborative approach to address the same. Also, for India, the discussion around circularity (especially in the context of EEE sector) has become all the more relevant and significant, as it aspires to become a Developed, Net Zero and Global Digital Economy. Infact, the ongoing discourse of sustainable electronics within the purview of circularity, is actively discussing aspects like changing connotation

of e-waste, green design, lifecycle management vs end-of-life management, resource efficiency, CRM & SRM availability, circular economy indicators, integration of informal sector, stakeholders' responsibility & awareness, role of industry; and policy push to build a facilitative ecosystem for circularity.

So, in this backdrop, the January (2024) edition of EcoTech Talks covers perspectives on circularity with respect to EEE sector. We certainly hope that these insights will educate and inspire the concerned stakeholders to take a step ahead in building a facilitative ecosystem and making a gradual transition towards substantive circularity.

Have a happy reading!

Warm regards

RETHINKING CIRCULARITY



CIRCULARITY AND EEE SECTOR:

THE EXPERT OPINION

Rethinking Circular Economy w.r.t. EEE sector



Dr Sandip Chatterjee

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Electronic and electrical equipments (EEE) are highly material consuming sector and critically dependent on supply chain of range of precious and rare earth metals. Rate of extraction of these resources is significantly higher than the rate of their formation in nature. India is the third largest consumer of raw materials produced globally and is estimated to consume nearly 15 billion tonnes of material by 2030.

Due to fast obsolescence, with improved functionality, the consumers are forced to discard their devices and electronics waste (e-waste) is thus growing at an exponential pace. EEE waste is, however, one of the rich sources of secondary raw materials and can contribute towards resource security and environmental sustainability.

Circular economy (CE) approach is, therefore, imperative to fulfil the resource need of the country. CE is an alternative industrial system, as against highly extractive and resource-

intensive linear economy which follows take-make-dispose approach. It replaces the end-of-life concept with restoration and regeneration, employs superior design of materials, products, systems and innovative business models for waste elimination.

Government of India had formulated an action plan to implement CE principle in the e-waste sector, which prioritized adoption of CE in entire life cycle of EEE products. To focus on end-of-life management, it stressed upon utilization of secondary raw material to lay strong foundation for expansive adoption of CE principles and retaining value of resources. The products and materials are being encouraged at its maximum use through reuse, repair, recover, recycling and remanufacturing at the end of each service value to minimize wastage at each life-cycle stage.

Further, in order to address significant loss of secondary raw material, capacity building of informal sector has been emphasised to boost collection, ensure resource efficiency in segregation and recycling. International standards including R2, e-Stewards, EU's CEN/ CENELAC standards have also been stressed to adopt in entire value chain.

Action plan has also emphasised material acquisition and green design for electronics products, so as to bring out a "Sustainable Product Policy", Green Skill Development Programme, Green public procurement (GPP) etc. in-line with global framework and best practices. An institutional arrangement was also envisioned to track critical raw materials and setting up of sampling labs to assess the secondary material presence in products.

Circular Economy indicator is another parameter, which could help in assessing the commitment of the producers towards sustainability. Incentivising manufacturers was proposed through CE indicator rating, which could be assessed through the usage of secondary raw material in new products, recyclable design, adoption of internationally harmonized resource efficiency/ circular economy etc. A policy to identify sustainable product to offer preference under the PLI scheme and Green Public procurement are the future action plans in order to ensure behavioural change

in the business process by the manufacturers. Guidelines for promotion of product lease model for bulk consumers in public sector to boost repaired and refurbished market would also be considered in near future.

The Right to Repair Act was also envisaged to provide consumers' access to affordable repaired mobile phones, appliances and other electronic devices by original equipment manufacturers (OEMs) or third-party repairers to promote refurbished products and longer life of the products of existing users.

Ministry of Electronics and Information Technology (MeitY) has initiated activities to realise the action plans. The programmes/ projects initiated, so far, include Awareness and Capacity Building on CE in E-waste; Entrepreneurial Skill Development in E-waste Management (Dismantling/ Segregations); Upgradation of Informal Sector by Setting up of MSME Cluster with Indigenous Technologies; Development of Cost-effective Processing Technology of Printed Circuit Boards, Li-ion batteries, spent magnets, solar panel etc.

Besides, a study has been carried out to learn international best practices on available technologies, utilisation of secondary raw material, tracking of critical raw materials etc. In addition, in order to promote state-of-art e-waste recycling facility in the country, the existing subsidy scheme, viz. Scheme for Promotion of

Manufacturing of Electronic Components and Semiconductors (SPECS) has been amended to provide financial incentive of 25% on capital expenditure for extraction of precious metals from e-waste components, including PCBs (both populated and bare), Li-ion batteries, spent magnets, solar PV panels, catalytic converters and any other components from electronics waste (any one component or in combination).



Rethinking circular economy in the context of the EEE sector

A circular economy for the EEE sector gained momentum in 2023. In 2024, there is every indication that there will be a greater push towards creating greater circularity. To realise this potential, a rethink of the opportunities for circularity along the dimensions of social, product and technical innovation is discussed.

SOCIAL INNOVATION

Socially innovative business models can play a pivotal role in making circular electronics safer, fairer and more inclusive. These models not only reduce e-waste but also foster economic resilience and skill development at the grassroots level. Policy frameworks need to be adapted to enable the creation of social enterprises and inclusive business models such as:

- Shared infrastructure for collection, dismantling and recycling (at a local or industrial park level) not only address environmental concerns but also contribute to the well-being of those involved in the recycling process.
- Repair and refurbishment enterprises that provide accessibility and affordability of digital technologies without adding the burden of new products.
- Training and upskilling programs that enable higher quality, better jobs and more productivity.
- Consumer behaviour changes that enable consumers to appreciate the value of circularity as a service.



Dr. Deepali Sinha Khetriwal
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PRODUCT INNOVATION

Circular design principles are influencing product innovation by emphasizing the importance of creating products considering the entire lifespan of a product during the design phase, from material selection and sourcing to end-of-life scenarios. At the forefront of product innovation for a circular economy some of the aspects to rethink are:

- Designing products with modular designs that allow for upgrade, repair and refurbishment.
- Material innovation in the form of non-toxic, recycled, eco-friendly and even biodegradable alternatives.
- Supply chain integration for circular products and materials with closer collaboration across the value chain.
- Business models to provide product-as-a-service (Paas) that incentivises durability over price.

TECHNOLOGY INNOVATION

Technology innovation spans recycling and recovery technologies as well as the application of digital technologies to improve circularity of electronics. Some areas of development in this direction are:

- Process innovations in hydrometallurgy, bioleaching and other technologies to recover critical raw materials present in tiny concentrations.
- Combination of manual and mechanical dismantling/demanufacturing to achieve better quality fractions.
- Digital tools and technologies for better transparency and traceability.

Many of these ideas are already being implemented, either as pilots, or niche products/ solutions. The success of a circular economy will be measured when these ideas are scaled.

Criticality of Critical Minerals for India's Circular Economy and Low-Carbon Ambitions



Prof. Kalyan Bhaskar
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The COP28 got over in Dubai a few days ago. One of the most significant things to come out from the COP28 was the agreement reached by the member countries to accelerate transition away from fossil fuels. This transition to a low carbon future will no doubt bring a lot of positives for the global environment, economy and society at large, but it will not be without its own set of challenges.

One of those challenges would be to deal with the high minerals intensity of the low carbon world. In 2020, the World Bank had mentioned in one of its reports that "a low carbon future will be a more minerals intensive future". Whether we think of Electric Vehicles (EV), Battery Energy Storage Systems (BESS), solar panels, wind turbines, or even the common electronic appliances we increasingly use in our daily lives, all of these would require a lot of minerals, prominent of which is a group known as critical minerals. While exact definition varies across countries, critical minerals are basically minerals that are of high importance to a country's economy and have a high risk in their supply chain. The supply chain risk can in turn be due to limited availability in a country, high dependence on imports, or high geographical concentration in a region or a country etc. India has made impressive strides in the 21st century, and

especially in the last decade to promote a number of low carbon technologies. However, that has also resulted in more demand and subsequent imports of critical minerals in India.

The challenging task for India would be to continue to move on a path of accelerated transition away from fossil fuels in a fair and an equitable manner (just transition) and also become more self-reliant in production of those low carbon technologies. The latter would require a more systematic and holistic management of critical minerals. After the Indian government came out with the first ever Indian list of critical minerals in June 2023, there have been a lot of developments in terms of discovery of new reserves of some critical minerals in various states, an increased push to exploration of other critical minerals in specific regions, and opening up exploration and mining of critical minerals to private firms.

One of the key strategies for managing critical minerals, as also outlined in the Indian government's report on critical minerals, is transitioning from linear to circular economy. Several governments around the world have introduced measures, incentives and targets for circular economy in the last couple of years. Used electronic products (e-waste) and other waste streams that contain a lot of valuable critical minerals are being looked as a source of urban mines that can be exploited to reduce dependency on imports and become self-reliant in critical minerals. However, recovering and recycling critical minerals and other precious metals from waste stream is only one key aspect of circular economy. It is necessary but not sufficient. Other measures and approaches like

promoting Design for Environment (DfE), eco-design, newer business models (e.g., leasing), using more recycled content in products, integrating, and not ignoring, informal waste management sector would be needed to promote and transition from linear to circular economy. Only when this vital link between India's circular economy plans and India's low carbon ambitions is recognized, will India be able to fully utilize the true potential of both.



#BEAGREENWARRIOR: COMPLETING A YEAR OF GREEN MOBILISATION

#BEAGREENWARRIOR: A SUSTAINABILITY CAMPAIGN STARTED IN JANUARY-2023 BY H.M.E-WASTE MANAGEMENT



- Campaign Objective: Mobilising the people to practice Environmentally Conscious Lifestyle (with special focus on LiFE Actions for E-waste Reduction) and become Pro Planet People.
- Main Inspiration: India Led Global Movement of Mission LiFE (Lifestyle for Environment)
- Campaign Beneficiaries or Participants: Schools, Colleges, Universities, RWAs, Community Organisations (NGOs), Corporate Organisations and Research Institutions.
- Campaign Outcome: By December 2023, H.M.E has successfully achieved its Green Resolution (2023) of sensitizing and mobilising Ten Thousand People to become Green Warriors or Pro-Planet People.

AWARENESS DRIVES FOR GREEN SENSITIZATION

During the fourth quarter (October- December: 2023), team H.M.E has collaborated with four New Green Warrior Institutions/Organisations and conducted awareness drives on 'Mission LiFE and E-waste Management' by involving multiple resources, beneficiaries and pedagogies.



14th October, 2023 : Awareness Drive for the waste -workers' community and teaching staff of Partnering Hope Into Action, PHIA Foundation (Bhowapur Slum Area, U.P.)



12th December, 2023 : Awareness Drive for the Project Manager, EHS officer, Managerial Staff and Site engineers of Larsen & Toubro (Kirari Project Site, Delhi)



22nd December, 2023 : Awareness Drive for the Project Manager, EHS Manager, Site Engineers, T&C Manager, Supervisors and Field Staff of Siemens Ltd (Krishna Park Project Site, Delhi)



27th, December, 2023 : Awareness Drive for the participants (Government Officers, NGO Representatives, Development Professionals and Scholars) of training programme at V.V. Giri National Labour Institute (VVGNI, Noida)

INTERACTION WITH INVISIBLE GREEN WARRIORS ON E-WASTE DAY

On the occasion of E-waste Day (14th October, 2023), H.M.E team with the active support of PHIA Foundation, organised an interactive session for the Waste- workers' Community ('The Invisible Green Warriors') from Bhowapur Slum Area, to get their perspective on E-waste, its management and their everyday work challenges. Some of the reported challenges were hazardous working conditions, lack of proper safety measures, health risks associated with the exposure to toxic substances, lack of awareness and knowledge regarding safe e-waste management practices, everyday vulnerabilities of being a migrant labourer, susceptible to exploitation and humiliation on account of lack of support in unfamiliar environment, and lack of social-security benefits. Through this enriching interaction, H.M.E would like make an advocacy for the inclusion and integration of these informal sector workers within the formal recycling sector as they are an important and potential stakeholder of circular economy.



GREEN EXCHANGE FOR CIRCULAR ECONOMY AND LABOUR DEVELOPMENT

On 27th December (2023), HME team was invited by V.V. Giri National Labour Institute, VVGNI (Under Ministry of Labour & Employment, GoI) to deliver a Training session on the theme of 'Workforce in E-Waste Recycling Sector: Issues and Solution', for a diverse group of participants (including Government Officers, NGO Representatives, Development Professionals, Scholars) from different parts of India. Mr. P. Amitav Khuntia (Course Director, Faculty and Coordinator: Centre for Climate Change and Labour, VVGNI) organised this entire Training Programme on 'Convergence and Partnership for Addressing Labour and Development Issues'. Along with this session, HME team also sensitised the participants about Mission LiFE & E-waste Management Rules (2022). Also, this engaging session has led to inputs and suggestions from the participants (such as adoption of system approach towards e-waste management, inclusive approach towards informal sector workers and their phase wise skill upgradation, access to affordable technological and infrastructure support, ensuring representation and visibility of informal sector in public and policy discourses, continuous perspective development and collaboration of all the stakeholders), which reinforced the need for 'Integration of Workforce from Informal Sector for Achieving Circular Economy'.



