H.M.E-WASTE MANAGEMENT
ETHICAL | TRANSPARENT | RECYCLING

QUARTERLY NEWSLETTER

ECOTECH TALKS

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-A collective endeavour for sustainability and change!
(Under the aegis of H.M.E-Waste Management)

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INSIDE THE NEWSLETTER

THE EDITOR'S NOTE

Unlocking the Regenerative Potential: Powering India's Circular Electronics Transition Through System Innovation and Refurbishment

Dear Readers,
Greetings!

The accelerating pace of technological innovation has led to unprecedented electronic consumption—and with it, a mounting e-waste challenge. Globally, the focus is shifting from incremental recycling to regenerative circularity, where systems are designed not just to minimize harm but to restore material, environmental, and social value. For India, among the fastest-growing electronics markets, this transition is both urgent and transformative. **Unlocking the regenerative potential** of the sector requires re-envisioning how products are designed, refurbished, and reintegrated into the economy. It calls for **system innovation**—policies and partnerships that enable resource recovery and design for longevity—and **refurbishment ecosystems** that translate circularity into ground-level impact while creating green livelihoods. Together, these pathways can advance India's circular electronics transition, aligning economic growth with ecological restoration and positioning the nation as a global exemplar in regenerative systems transformation.

In this backdrop, the October Edition (2025) of EcoTech Talks explore this critical theme to inform, engage and educate the stakeholders on the pathways driving India's Circular Electronics Transition.

Have a happy reading!

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GREEN CONTRIBUTORS AND THEIR EXPERT OPINION

Closing the Loop: How Refurbishment is Powering Sustainable Electronics

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Introduction

The Electronics System Design and Manufacturing (ESDM) sector is the heartbeat of India's digital economy—powering innovation, connectivity, and productivity across every domain. The sector is expanding at an unprecedented pace, with the domestic electronics market valued at USD 155 billion, and India aiming to achieve a USD 1 trillion digital economy in few coming years.

Flagship programs such as Digital India, Smart Cities Mission, and Production-Linked Incentive (PLI) schemes have propelled India toward becoming a global hub for electronics manufacturing. The India Semiconductor Mission with the establishment of semiconductor fabrication further demonstrates this ambition.

Electronic and Electrical Equipments (EEE) manufacturing is dependent on high material consumption with various rare earth elements. Rate of extraction of these abiotic resources for EEE manufacturing is significantly higher than the rate of their formation in nature. Due to growing demand of electronics sector, India became the third largest consumer of raw materials produced globally, and with the current economic trend, estimated to consume nearly 15 billion tonnes of raw material by 2030.

Moreover, this rapid growth of Electronic sector also brought an escalating challenge: E-waste generation. According to the UN Global E-waste Monitor 2022, India is the third-largest generator of e-waste globally, producing 4.17 million metric tonnes annually, with an 18% annual growth rate. This creates mounting pressure on ESDM ecosystems, critical materials supply chain, environmental issues etc.

To sustain this momentum responsibly, India is steering toward a Circular Economy (CE) model—replacing the linear "take–make–dispose" pattern with a regenerative approach of "reduce–reuse–repair–refurbish–recycle-remanufacture."

Refurbishment: A Mid-Loop Catalyst in the Circular Economy

Refurbishment serves as a mid-loop strategy in the circular economy, positioned between repairs and recycling. It extends the lifespan of products, retains embedded materials and energy and reduces dependence on virgin resource extraction. Unlike recycling, which focuses on material recovery after a product's end of life, refurbishment revitalizes existing products, returning them to productive use.

It thereby combines economic inclusion with environmental preservation, creating an ecosystem of affordable access, employment, and resource efficiency.

"Refurbishment bridges the gap between innovation and conservation—it is where sustainability meets affordability."

The refurbishment ecosystem is not only an environmental imperative but a strategic necessity for resource security. With India relying heavily on imports for critical minerals such as lithium, neodymium, refurbishment and component reuse would reduce external dependency while conserving valuable materials domestically. The Ministry of Mines has already identified 30 critical minerals, more than half of which are fully import-dependent— making resource circularity vital for national resilience. Circular economy approach is thus imperative to fulfill the need of resources for the growing economy, like India.

India's Policy Framework: Strengthening the Circular Electronics Ecosystem

The Ministry of Electronics and Information Technology (MeitY), Govt. of India has undertaken several flagship initiatives under its Circular Economy Action Plan to mainstream circularity within the electronics ecosystem. These initiatives span R&D and technology innovation, RoHS compliance and testing facility, skill and capacity development, awareness, informal sector formalization, and advanced recycling infrastructure.

1. R&D and Technology Development

A Centre of Excellence (CoE) on E-waste Management has been established at C-MET, Hyderabad, as India's hub for R&D, start-up incubation, and technology transfer. Its focus areas include developing cost-effective recycling technologies for spent PCBs, Lithium-ion batteries, fluorescent lamp phosphors, Rare Earth Permanent Magnets, and Solar Panels.

Over 25 industries have already adopted these technologies, and technology transfer to another 25 is in progress. A pilot-scale facility for PCB recycling (1 Tonne/day) and a pilot project for NdFeB magnet production from spent magnets—recovering rare earth elements like neodymium and praseodymium—represent key milestones in building domestic capability for critical mineral recovery.

2. Skilling and Capacity Building for a Green Workforce

Recognizing that sustainable electronics require skilled human capital, MeitY has established e-waste dismantling and segregation facilities at NIELIT Gangtok, Panjab University Chandigarh and C-MET Hyderabad. Standardized training curricula aligned with the National Skills Qualification Framework (NSQF) and supported by a Learning Management System (LMS) are building a national talent pool for responsible recycling.

More than 3000 professionals have been trained across the country in environmentally sound dismantling, segregation, and e-waste handling. In parallel, an AICTE approved M.Tech program on E-waste Managementat IIT Hyderabad—now in its third cohort—is nurturing future innovators and entrepreneurs in the green electronics domain.

"India's circular transformation must also be a social transition—creating jobs while protecting the environment."

3. Formalizing the Informal Sector

India's informal e-waste ecosystem—comprising over 20lakh workers—plays an essential role in material recovery but often operates without environmental or safety safeguards. To transform this segment, MeitY launched the project on "Informal Sector Capacity Building and Upgradation with Formation of Recycling Clusters" under the CDP-MSME scheme of Ministry of MSME.

Implemented jointly by C-MET Hyderabad, CIPET Bhubaneswar and NML Jamshedpur, the project aims to

create 30 e-waste recycling clusters across India, engage and upskill 15,000 informal workers, and facilitate their integration into the formal recycling ecosystem. This approach ensures that India's transition to circularity is inclusive, combining economic empowerment with environmental protection.

"Empowering the informal sector is the corner stone of India's inclusive circular economy."

4. International Best Practices

In collaboration with GIZ under EU-REI program, MeitY has also undertaken a study on global best practices in circular electronics to align India's policy and regulatory frameworks with international benchmarks. A project on Circular Pathways for High-Value Plastics from E-waste in India is also being implemented by GIZ team with MeitY's support.

The recently initiated project supported by the Global Environment Facility (GEF) and implemented by the United Nations Development Programme (UNDP), in partnership with the Ministry of Electronics and Information Technology, Government of India, will support India's transition to a circular economy in the electronics sector by ensuring the environmentally sound management of e-waste, one of the country's fastest growing waste streams. This five-year initiative is designed to reduce hazardous material use, recover valuable materials, and improve resource availability in the electrical and electronics sector through refurbishment.

5. RoHS Compliance and Testing Facility

The Restriction of Hazardous Substances (RoHS) directive currently restricts the use of ten hazardous substances in EEE products: lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE), bis (2-ethylhexyl) phthalate (DEHP), butyl benzyl phthalate (BBP), dibutyl phthalate (DBP) and diisobutyl phthalate (DIBP). RoHS regulations apply to all the manufacturers and distributors of electronic and electrical equipment, and compliance is mandatory for any sellable product sold in the EU. The Restriction of Hazardous Substances (RoHS) testing facility at C-MET, Hyderabad laboratory is a self-sustainable world class NABL accredited testing facility under RoHS directive for the evaluation of electronic and related products to help the Electrical Electronics Equipment (EEE) industries. This RoHS testing facility has been established under the aegis of Ministry of Electronics & IT (MeitY), Government of India. This facility follows all Standard Operating Procedures (SOPs) as per IEC 62321-3-5:2023 standard. RoHS analysis of variety of products are being carried out using these advanced characterization facilities. The test facility is accredited as per ISO 17025:2017 standard by National Accreditation Board for Testing & Calibration Laboratories (NABL), Department of Science & Technology, Government of India, in the field of chemical analysis of electronic materials (polymers, metals, etc.).

Refurbishment as a Strategic Enabler of Sustainable Growth

Refurbishment lies at the intersection of sustainability and innovation. It reduces carbon footprints, extends product life, and stimulates the secondary electronics market. More importantly, it promotes local value addition—through repair hubs, testing centers, and small-scale component recovery enterprises.

By reducing dependency on virgin resources and imported materials, refurbishment supports economic decoupling — a model of growth that expands prosperity without increasing resource consumption. This aligns directly with India's Sustainable Development Goals (SDGs) and the vision of a resource-secure "Viksit Bharat 2047."

"In the circular economy, refurbishment is not an after thought—it is a design principle."

Conclusion

India's journey toward a Circular Electronics Economy marks a paradigm shift—from waste management to resource management, and from consumption to regeneration. Through the concerted efforts of MeitY, industry stakeholders, academia, and the informal workforce, India is building an ecosystem that combines environmental stewardship with economic competitiveness.

As Hon'ble Prime Minister of India aptly stated, "Circular Economy is not merely a concept—it is the pathway to sustainable prosperity". Refurbishment exemplifies that vision. It closes material loops, creates green jobs, reduces import dependence, and powers a sustainable, resilient, and self-reliant electronics future for India.

The way ahead lies in scaling refurbishment infrastructure, promoting product design for longevity and repairability, and strengthening reverse logistics frameworks to support efficient collection and resale of pre-owned electronics. Enhanced collaboration between government, industry, and academia will be key to transforming refurbishment from an emerging practice into a mainstream pillar of India's sustainable growth model.

"Closing the loop means opening the future—toward a cleaner, circular, and self-reliant India."

GREEN CONTRIBUTORS AND THEIR EXPERT OPINION

Unlocking the FREEDOM Framework to Transform the Landscape of E-waste Management in India: Pathways to Circular Economy

Mr. Gautam Mehra (Chief of Innovation and R&D)

Mr. Anwar Shirpurwala (Group Chairman)

OpenGate Global Enterprises LLP

India is at the cusp of an explosion in economic growth. Over the years, the policy frameworks that have been developed by the Government focus on manufacturing and entrepreneurship which will drive the next generation of growth. The service sector seems to have stalled over the last few years except for the 'Gig Economy' which fuelled a spurt in jobs. The FREEDOM Framework unleashes upon us the possibilities to transform the landscape of e-waste management through a systems change approach which not only powers the manufacturing sector but also creates 'Green Jobs', ensures self-reliance in resources, and propels India to explore pathways for other waste streams which are a haven of resources which can power production and manufacturing in the country.

The State of E-waste Management in India

India is the 3rd largest generator of e-waste in the world generating 4.1 million metric tonnes in 2022. However, the informal sector is at the heart of e-waste management. It is able to collect, channelise the material across value chain actors, dismantle and recycle using technology which is not environment friendly leading to health and ecological hazards. According to the CPCB, India has authorised e-waste recycling capacity of 1.6 million metric tonnes which according to recyclers is not utilised because of lack of availability of e-waste.

Rules and Regulations

India introduced the e-waste management and handling rules in 2011 which were revised in 2016 with the e-waste management rules and further revised with the introduction of the EPR framework in 2022. The e-waste management rules, 2022 which introduces Extended Producer Responsibility and its digital monitoring by the CPCB ensures that incentives are provided to recyclers to recycle as much e-waste as they can, on the basis of their capacity, generate EPR certificates and encash them with OEMs, manufacturers and producers who are obligated under the rules to fulfil EPR compliance. The rule has been a game-changer in promoting formal recycling of e-waste. Informal actors have formalised which has ensured rise in authorised capacity in the country over the last 3 years.

Driving Systems Change through the FREEDOM Framework

The FREEDOM Framework recognises the role and importance of the informal actors in ensuring we move towards environmentally sound management of e-waste in the country. The key issues which are faced by the formal recyclers are: lack of availability of materials, technology for recycling of rare earths and critical raw materials, skills for advanced recycling, cheaper finance for setting up of high end infrastructure, availability of waste for free to mitigate logistics cost. The key issues which are faced by the informal actors are: availability of land, finance and technology to be able to upgrade to becoming formal recyclers. The FREEDOM Framework presents pathways which will lead to formalisation of informal actors, their social upliftment, strengthening of livelihoods through formalisation, ecological benefits for the community through environmentally sound recycling of e-waste and mitigation of hazards.

Creation of this ecosystem requires stakeholders to work closely with each other. The central and state governments have multiple schemes which can be accessed for development of infrastructure, technology which can be provided at low cost, land, which can be pooled to ensure that capital costs for each actor are significantly reduced. The benefits through trade of EPR credits and the additional income which can accrue to these actors who recycle will ensure that a larger quantum of material is recycled formally. The creation of the ecosystem ensures sustainability and can be replicated across different waste streams.

Conclusion

The FREEDOM Framework offers India a unique opportunity to transform e-waste management into a driver of sustainability, innovation, and inclusive growth. By integrating the strengths of both formal and informal sectors, scaling authorised recycling capacity, and enabling access to technology, finance, and infrastructure, the framework lays the foundation for a resilient circular economy. At the same time, it reimagines e-waste not as an environmental burden but as a resource that can generate green jobs, foster social upliftment, and strengthen national self-reliance. If pursued with collective intent, the FREEDOM Framework can position India as a global leader in responsible resource management—pioneering pathways that protect the planet while powering future economic growth.

OUR GREEN INITIATIVES AND ACTIVITIES

#BeAGreenWarrior: Our Umbrella Campaign For Sustainability

E-Waste Awareness And Collection Drives

2nd July, 2025- Mapsko CasaBella RWA
(Gurugram, Haryana)

11th July, 2025- Casio India Co. Private Ltd.
(Mathura Road, New Delhi)

9th Sept, 2025- DEX Group Management Office
(Gurugram, Haryana)

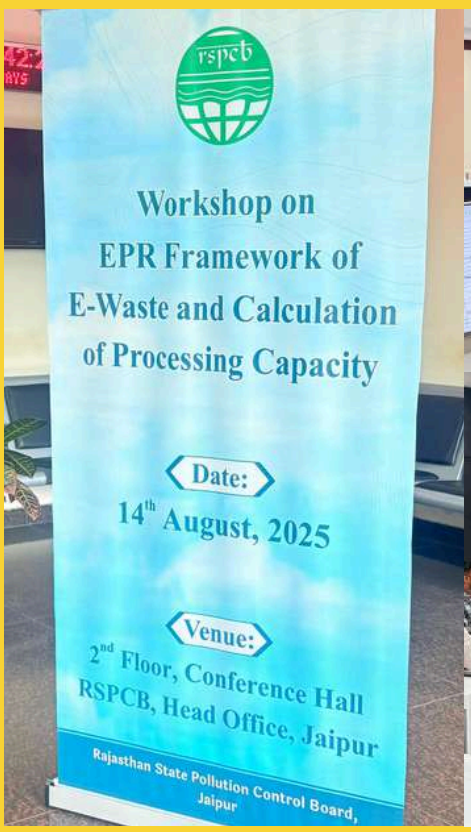
15th Sept, 2025- Stanley Black & Decker India Pvt. Ltd.
(Pune, Maharashtra)

16th Sept, 2025- SMA Solar India Pvt. Ltd.
(Mumbai, Maharashtra)

11th – 22nd Sept, 2025- DEX Group Corporate Office
(Kailash Colony Ext., New Delhi)

29th Sept, 2025- Institute of Vocational Studies- Affiliated To GGSIP University (Sheikh Sarai, New Delhi)

Participation In RSPCB's Workshop On E-Waste EPR Framework & Processing Capacity



PARTICIPATION IN SWACHHOTSAV- 2025: A SWACHH BHARAT MISSION INITIATIVE

Recognition For Our Sustainability Initiatives By MCD- Central Zone

MUNICIPAL CORPORATION OF DELHI
CENTRAL ZONE

CERTIFICATE OF PARTICIPATION
"SWACHHATA CARNIVAL 2025"

AWARDED TO

HME WASTE MANAGEMENT

In recognition of your significant contribution and active participation during the Swachhata Pakhwada - 2025. We extend our heartfelt gratitude and wish you all the best for your future endeavors.

SWACHHOTSAV
Swachhata Hi Seva 2025

(Shashvat Saurabh), I.A.S
Deputy Commissioner
Central Zone

SPECIAL THANKS TO OUR SUSTAINABILITY PARTNERS

Panasonic · StanleyBlack&Decker · CASIO · Labcare · ULTINON · passion to lead EPSILON · SMA · Rx Infotech P Ltd · OSRAM · DAMIER · ESTEX TELECOM · LUOKE HRK · ARHAM TECHNOLOGIES LIMITED · D R ENGINEERING · ideal POWER TOOLS · SCJ · LFORCE LIFE · Dolphin हमसे है Embroidery · SEMITECH · OSR EQUIPMENT SERVICES AND SOLUTIONS · Melody Media · SAISTAR · ASTA TECHNOLOGIES

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