



Circular Economy in Electrical and Electronics Sector

**European Union –
Resource Efficiency Initiative Phase II (2021 – 2023)**

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Electrical and Electronic Equipment (EEE) Sector & E-Waste



EU-REI

Creating a Resource
Efficient India

- Electrical and Electronic Equipment (EEE) have penetrated almost every aspect of our lives.
- With growing population, increasing urbanisation, and flagship programmes such as **Digital India**, EEE is now a necessity.
- The importance of EEE was further highlighted during the recent COVID-19 pandemic, which increased the demand for telecommuting for work, education, and entertainment thereby disrupting the global manufacturing supply chains and straining the limited raw materials, including mineral stocks and resources, available.
- Dependence on EEE has facilitated convenience in the lives of people. However, this has resulted in excessive resource and virgin raw material consumption and widespread disposal of obsolete and end-of-life EEE at a global level.

The Global E-waste Monitor 2020 highlighted that India was the 3rd largest generator of e-waste with 3.2 MT after China (10.1 MT) and USA (6.9MT) in 2019.

In the past four decades, the metal requirement has increased by 87%, and that by 2060 the global consumption of materials would double (Meity).



Electrical and Electronic Equipment (EEE) Sector & E-Waste



Moving forward...

- It is essential to incorporate circularity in e-waste management – Missing from current e-waste legislation as it majorly stresses on increasing recycling rates rather than extending the life of EEE.
- Circularity in EEE can be achieved by decoupling resource consumption and e-waste generation from growth in the EEE sector and transitioning away from the resource intensive, linear, take-make-dispose economy, and towards circularity and resource efficiency throughout the EEE supply and value chain.
- The concept of circular economy is based on retaining the value of resources, products, and materials by keeping them in use for as long as possible, simultaneously striving to minimize waste generation and prevent leakages at each life-cycle stage.

**Linear economy
creates waste**



**Circular economy
eliminates waste**





Electrical and Electronic Equipment (EEE) Sector & E-Waste



Challenges in transitioning towards circular EEE

- Lack of Awareness & Capacity
- Lack of proper definition - Leading to incorrect/ underestimations of e-waste generation
- Rudimentary technology and informal processing of waste
- Infrastructure gaps
- No monitoring and tracking
- Invisible nature of the parallel, informal sector
- Limited responsibility sharing amongst the stakeholders

Through a Shared Responsibility Structure - e-waste should be looked at as a valuable resource of critical raw materials to meet the growing demand through Sustainable Consumption and Production practices meeting (UN-SDG-12).

It has been established that e-waste can act like a concentrated ore with nearly 1.5 kg of recoverable gold available in one tonne of mobile phone's polychlorinated biphenyls (PCB) as compared to one tonne of natural ore, which has an extractable reserve of 1.4 grams of gold only.



Extended Producer Responsibility (EPR)

*EPR is based on the **Polluter-Pays Principle** wherein the producer's responsibility of a manufactured product is extended to the post-consumer stage of the life cycle. In doing so, the EPR aims to achieve the two main goals of:*

- Shifting full or part responsibility of waste management at end-of-life (EOL) away from financially constrained ULBs and government to the producers, thereby internalizing the EOL management cost.*
- Providing incentives to producers to incorporate environmental considerations such as “design-for-repairability” right to “design for dismantlability” while designing their products.*



Policy Support for Circular Economy in EEE



E-Waste (Management and Handling) Rules, 2022

- Covers a wide range of EEE in six categories (LSEEW, EETW, MDW, Laboratory Instruments)
- Key stakeholders covered under the draft rules include **manufacturers, producers, refurbishers, and recyclers.**
- Leverage digital technology in the form of a centralized Online Portal for monitoring & tracking of e-waste movement through registered stakeholders.
- EPR for e-waste described with collection targets and EPR certificates to be traded like carbon credits. Schedule III of the Rules, specifies E-waste recycling targets (weight) for the financial year 2022-23, 2023-24 and 202-25 onwards.
- Penalty for violations described along with reimbursement system.
- Overall monitoring by Steering Committee described along with responsibilities of state governments and pollution control boards and urban local bodies.
- Mandates the manufactures, producers, recyclers and dismantlers to be registered on the centralized CPCB portal and not to engage with any unregistered manufacturers, producers, recyclers and refurbishers.
- Defines the responsibilities of Bureau of Indian Standards/ MeitY.
- Generation of EPR certificates through the portal in favour of registered recyclers & refurbishing certificates in the favor of registered refurbishers in the prescribed format.



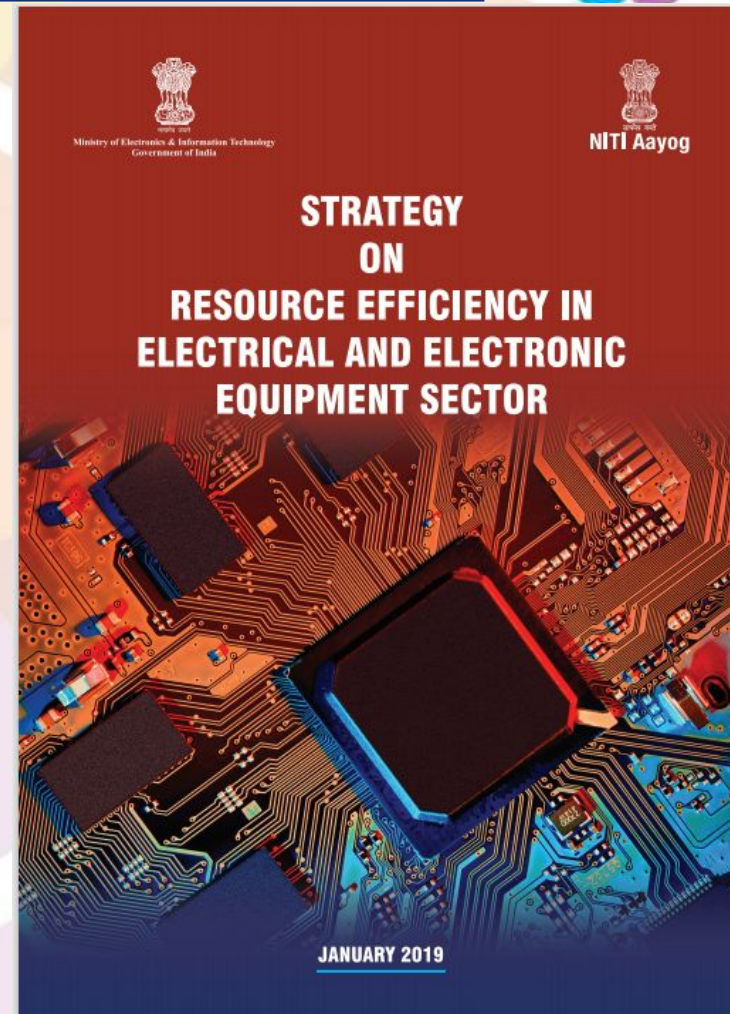
Genesis & Background – EUREI contribution to EEE



- Strategy on RE in EEE Sector released in 2019 with NITI Aayog

It included an **action plan** with **recommendations**:

- Initiate a resource efficiency scheme
- Incorporate the role of local bodies and informal sector in collection of e-waste
- Feasibility Study for Assessing Secondary Resource Utilization Potential
- Capacity building of the informal sector and actors for proper handling of e-waste
- Business models for technology proliferation
- Policy & Guidelines for Promoting RE for eco-design, BAT for decontamination and dismantling, increased use of secondary raw materials in EEE production
- Awareness Programme for all stakeholders
- Standards for reuse and refurbishment



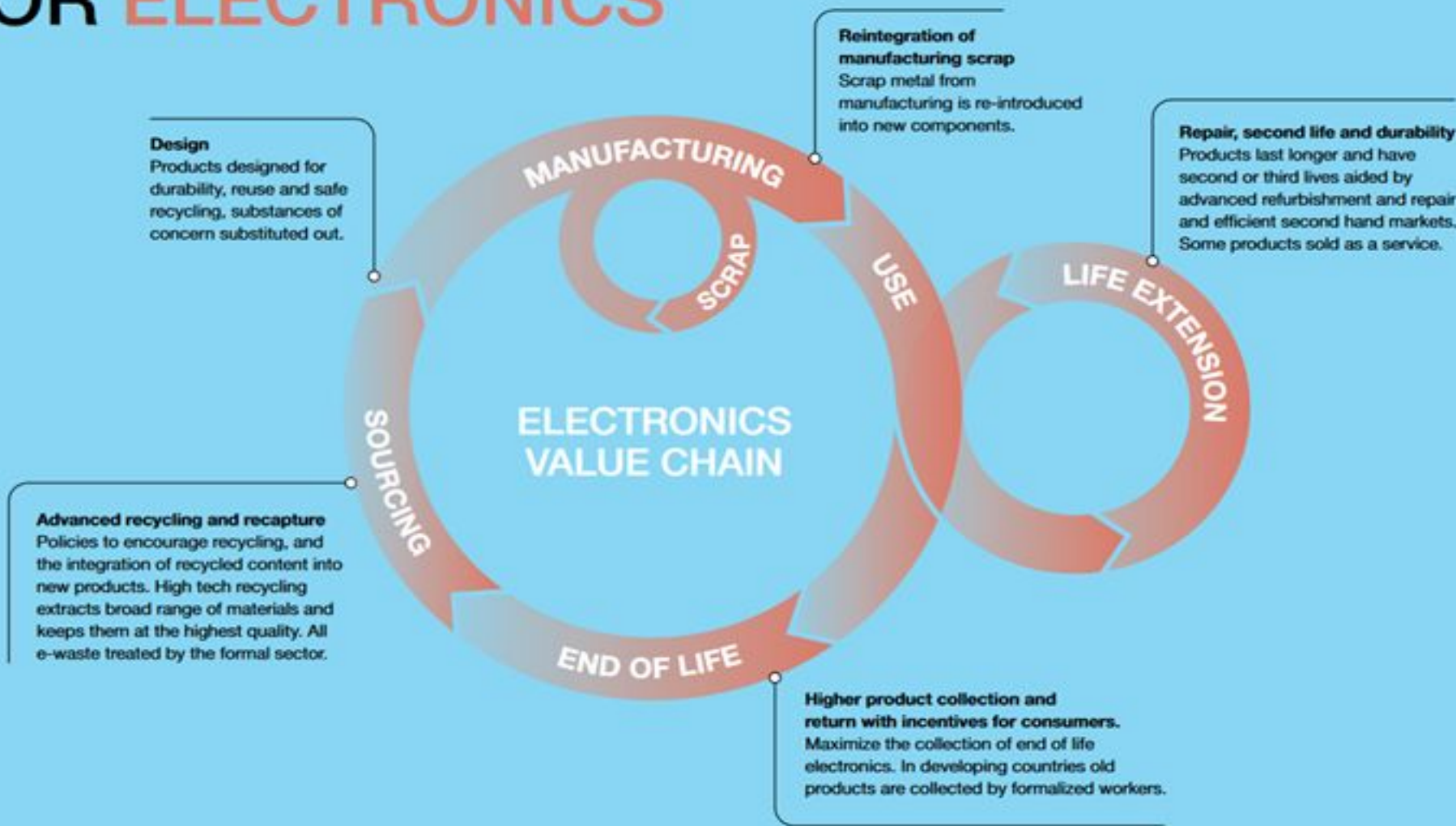
[NA_MeITy_RE Strategy in EEE Sector_Jan 2019.pdf \(eu-rei.com\)](#)



Circular Economy Action Plan (CEAP) for Electrical and Electronics Sector



A NEW CIRCULAR VISION FOR **ELECTRONICS**

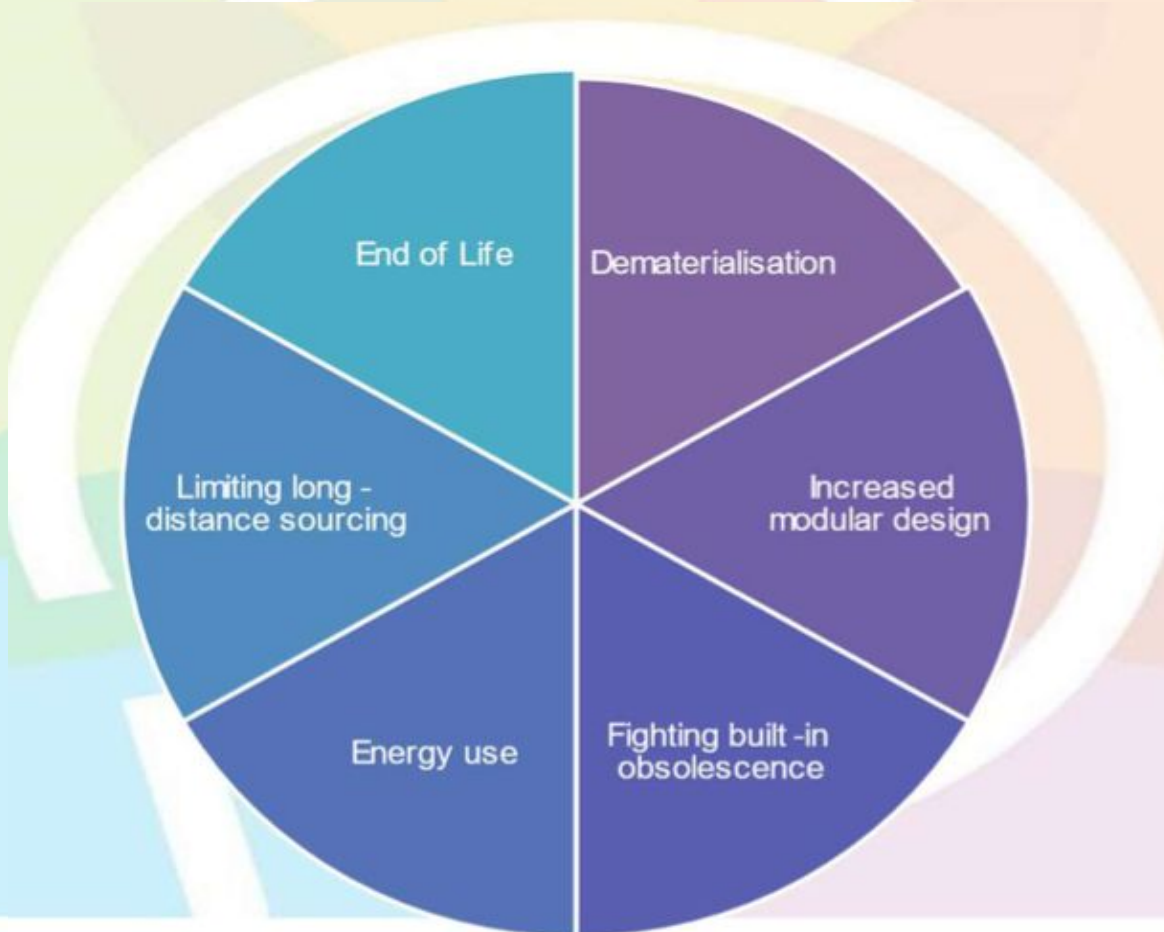




Circularity in EEE: A Regenerative Economy through Eco-Design



- Eco-design—Design for Recyclability/ sustainability (Life Cycle, Systems Thinking, Systems Design)





Circularity in EEE: A Regenerative Economy through Eco-Design



Dematerialization & Material Management	Materials of concern reduced	Design for Reuse & Recyclability	Innovation
<ul style="list-style-type: none">- Reduce Product size/ Weight- Conserve raw materials- Reduce GHG during material extraction, manufacturing, and transport;- Packaging;- Ethical raw material sourcing- GPP- Sustainable forestry and material selection	<ul style="list-style-type: none">- Design products and manufacturing processes to reduce materials of concern;- Reduction in generation of hazardous waste and occupational exposure.	<ul style="list-style-type: none">- Part-update approach- Fighting built-in planned obsolescence- Easy dismantle and recycling at EOL – snap-fit parts, avoiding paint/ varnish etc.- Replace difficult to recycle materials with recyclable/ valuable – Aluminum etc.- Modular design for disassembly<ul style="list-style-type: none">- easy replacement, upgrades, servicing, maintenance.	<ul style="list-style-type: none">- From design to manufacturing, transport to reduce environmental impacts and product and packaging- Innovative consumption and use models – product lease model, Digital product passport, etc to encourage SCP.



Circularity in EEE: A Regenerative Economy through Eco-Design



- EEE design controlled by a few major players – This is needed to be changed !!
- Identifying stakeholders and defining their roles in contribution to eco design -
 - Ø Role of International Telecommunication Union (ITU) in providing technical guidance on environmentally conscious design, maintenance, repair and operating principles and best practices
- Product and Material Passport to include eco-labelling
- Global benchmarking (eco-design, recycling technology) - in sync with global benchmarks of UN SDG goals etc
 - Ø Enable trade of materials and resources
 - Ø Creation of a robust market for refurbished products and SRM



Circularity in EEE: A Regenerative Economy through Eco-Design



□ Right to Repair

Legislation intended to allow consumers the **ability to repair and modify their consumer electronic devices with ease and at reasonable cost**, without being captive to the whims of manufacturers for repairs.

Right to Repair Framework

- **Mandatory** for manufacturers to **share their product details with customers** so that they can either repair them by self or 3rd parties rather than depending on OEMs.
- **Harmonise trade b/w the OEMs and third-party buyers and sellers** - creating new jobs.
- **Global Status:**
 - The right to repair recognised in many countries including the **US, UK and EU**
 - **Federal Trade Commission (USA)** directed manufacturers to **remedy unfair anti-competitive practices** and ensure consumers can make repairs, either themselves or by a third-party agency.

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- **Right-to-Repair Benefits**
 - **Boost business for small repair shops/ informal sector** important part of local economies.
 - **Reduce the e-waste generation.**
 - **Save consumers' money.**
 - **Achieving CE objectives of improving life span**



CE Action Plan for Electrical and Electronics Sector: Areas of EU-REI Support



- **Preparation of a Study on Circular Solutions to Selected EEE Life-cycle Stages:**
 - **Raw material acquisition stage:** Assessment of critical raw materials (CRM) and the potential contribution of secondary raw materials (SRM) in order to contribute to a knowledge base, on which further actions can build upon
 - **Recycling and recovery stage:** Global best available technologies to promote recycling and recovery of SRM will be identified, analysed and compared and recycling and refurbishment technologies at a local and global level will be assessed
- **Guidance document for development of digital mechanism to track use of critical raw materials in India:**
 - Recommendations for developing a mechanism to **digitally track the use of critical materials** in India and their **supply from mining e-waste**
 - EU-REI will consider experiences from the **PROSUM project in the EU**, which digitally tracks material specific data from electronic, automobiles, construction, mining waste and solar panels.
 - Knowledge exchange webinars with experts on the subject



CE Action Plan for Electrical and Electronics Sector: Areas of EU-REI Support



□ Recommendations for draft eco design guidelines for EEE Sector:

- Consider global best practices and CE measures that ensure that the manufacturers follow the eco-design principles:
 - Enhance at first the durability, reparability, upgradeability,
 - To design products that can be easily dismantled and disassembled into different components and materials can flow into the streams for repair, refurbishment or recycling
 - To develop a criteria to identify and assess products which have a superior environmental performance

□ Policy document on Circular Economy Indicators:

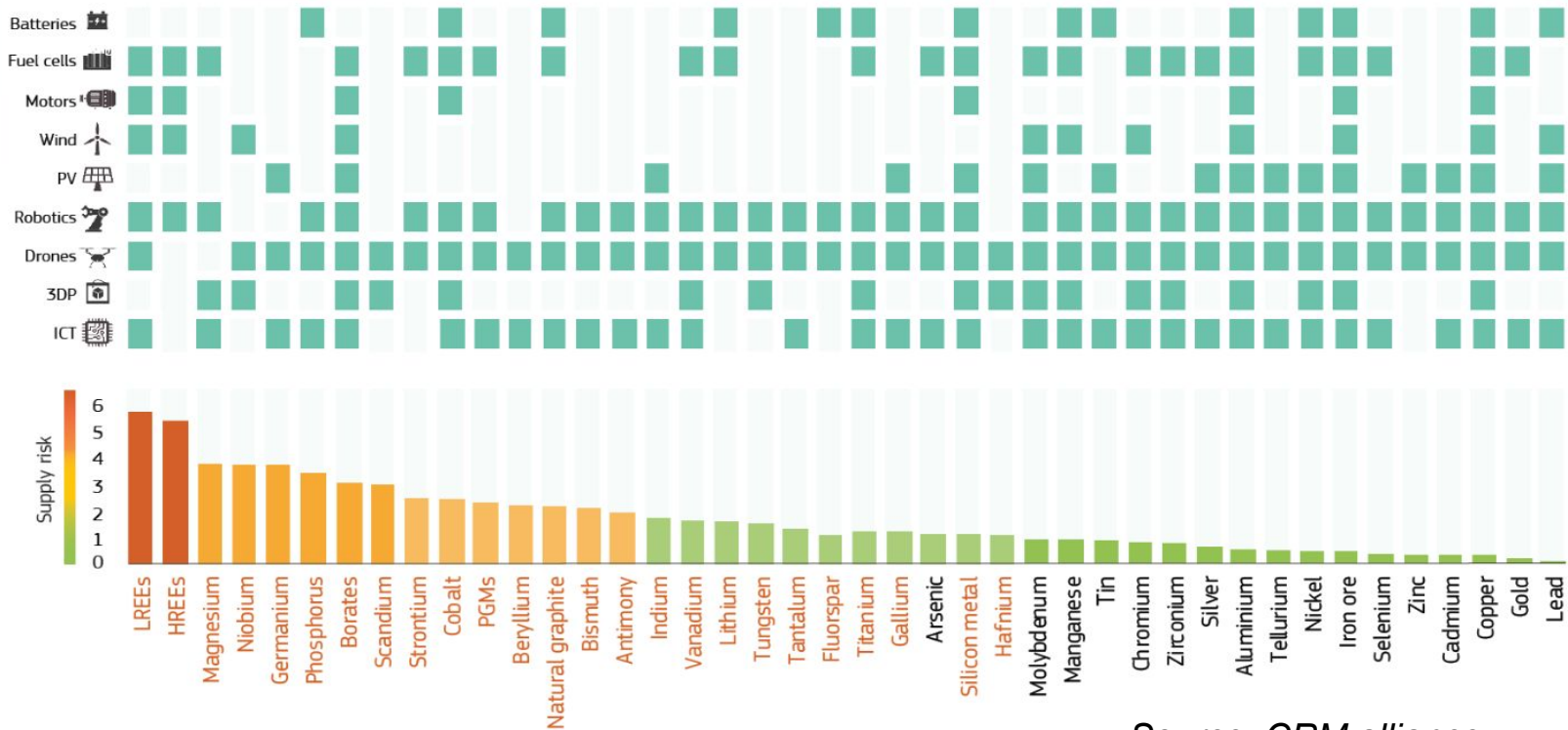
- To create benchmarks for CE approaches in order to effectively monitor implementation and progress - to evaluate performance, productivity, and waste discharge.

□ Support on Product Subscription and Lease Models

- Technical Inputs through review of best practices
- Identification of measures to support implementation of product subscription models

Critical

SUPPLY RISK OF RAW MATERIALS FOR KEY TECHNOLOGIES



Source: CRM alliance

- Life cycle inventory of the occurrence of the critical raw materials in selected groups of electronic devices
- Analysis of enhancing raw material supply and use of CRMs and recycling potential



Next Steps



- Development of **CE Indicators Index** to measure economic, environmental, and social impact- Taking into account the shared responsibility structure.
- **Digital tracking/ CRM and SRM tracking**
 - Ø Materials and products across life cycle including registry of spare parts
 - Ø Technologies including digital IOT, Block Chain, RFID, GPS etc
 - Ø Monitoring can be through trading of EPR credit to be sold by entities and recorded in the dashboard tracking secondary raw materials in the system.
- Scheme planning - Feeder-Cluster approach to enable **Informal Sector Integration**
 - Ø **Clusters** formation in 27-30 states using MSME scheme fund creation of these clusters
 - Ø **Micro factories** to act as feeder to clusters – providing opportunity, access, and financial support to informal sector working in silos to formalize and become part of the formal value chain
- **Skill Development** - Sensitisation of masses, channelizing waste materials to clusters.



Thanks for your attention

Questions & Comments

