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A Comparative Study of Environmental Liability, Producer Responsibility and Environmental Justice in India and the European Union

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***Abstract*—The rapid expansion of digital technologies has resulted in a substantial increase in electronic waste (e-waste), creating complex environmental, social, and legal challenges. Improper disposal and unsafe recycling of discarded electrical and electronic equipment can contaminate soil, water, and air while exposing workers and nearby communities to hazardous substances. The resulting damage raises a fundamental question of environmental liability: who should bear the financial and legal responsibility for pollution, remediation, and compensation? This paper undertakes a comparative doctrinal study of India's E-Waste (Management) Rules, 2022, as amended, and the European Union's Waste Electrical and Electronic Equipment (WEEE) Directive, 2012/19/EU, alongside relevant environmental liability legislation and international instruments. It examines the generation and environmental consequences of e-waste, the legal procedures governing its management, the allocation of responsibility among producers, recyclers, consumers, and regulatory authorities, and the enforcement challenges confronting both jurisdictions. The paper argues that Extended Producer Responsibility (EPR) provides an important mechanism for financing e-waste management but does not, by itself, resolve every question concerning environmental remediation or compensation for affected communities. It concludes that India can strengthen its regulatory framework through improved traceability, independent verification, financial safeguards, accessible remedies, and stronger integration of environmental justice into liability enforcement. The ultimate objective should be to ensure that the costs of electronic consumption are not unfairly transferred to workers, vulnerable communities, or the public.**

***Index Terms*—E-waste, environmental liability, Extended Producer Responsibility, polluter-pays principle, environmental justice, India, European Union, environmental remediation.**

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I. INTRODUCTION

1.1 Meaning and nature of e-waste

Electronic waste, commonly known as e-waste, refers to discarded electrical and electronic equipment and its components that have reached the end of their useful lives or have otherwise been rejected as waste. It includes computers, mobile phones, televisions, printers, refrigerators, washing machines, telecommunications equipment, and other electronic devices.[1] Rule 3 of India's E-Waste (Management) Rules, 2022 defines e-waste by reference to electrical and electronic equipment, including solar photovoltaic modules, panels, and cells, that are discarded wholly or partly as waste, together with specified rejects from manufacturing, refurbishment, and repair processes. The rules apply to the equipment categories listed in Schedule I, subject to their exclusions.[2] E-waste differs from ordinary municipal waste because electronic products contain both valuable recoverable materials and potentially hazardous substances. Copper, aluminium, gold, and other materials may be recovered through appropriate recycling. However, unsafe dismantling, burning, or chemical processing can release lead, mercury, cadmium, and other hazardous substances into the environment.[3] E-waste is therefore simultaneously a waste-management problem, a resource-recovery opportunity, and an environmental liability concern.

1.2 Sources and types of e-waste

The principal sources of e-waste include:

1. Households: Discarded mobile phones, televisions, computers, refrigerators, air conditioners, and other domestic appliances.
2. Commercial establishments: Obsolete computers, printers, networking equipment, servers, and office electronics.
3. Government institutions and educational establishments: Discarded information technology equipment, communication systems, and laboratory electronics.
4. Manufacturing and repair facilities: Rejected electronic components, defective equipment, production rejects, and parts removed during repair.
5. Telecommunications and data infrastructure: Retired routers, switches, cables, servers, and other network equipment.
6. Renewable-energy installations: Discarded solar photovoltaic modules and panels covered by applicable e-waste rules.
7. Imports and transboundary movements: Used equipment and waste arriving from other jurisdictions, subject to the applicable import, export, and waste-shipment rules.

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[1] The E-Waste (Management) Rules, 2022, G.S.R. 801(E), Gazette of India, Extraordinary, pt. II, sec. 3(i), Nov. 2, 2022 (as amended), r. 3(1)(l) and sch. I, India Code, available at: https://upload.indiacode.nic.in/showfile?actid=AC_CEN_16_18_00011_198629_1517807327582&filename=e-waste_rules_2022.pdf&type=rule (last visited on Oct. 19, 2026).

[2] E-Waste (Management) Rules, 2022, *supra* note 1, rr. 2 and 3(1)(l) and sch. I.

[3] World Health Organization, "Children and Digital Dumpsites: E-waste Exposure and Child Health" (Geneva, 2021), available at: https://www.who.int/publications/i/item/9789240023901 (last visited on Oct. 19, 2026).

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The major categories include information technology and telecommunications equipment, consumer electronics, large and small electrical appliances, lighting equipment, monitoring and control instruments, and solar photovoltaic equipment.[4]

Batteries contained in electronic products require particular care because waste batteries are separately regulated in India under the Battery Waste Management Rules, 2022. Their presence does not eliminate the need to manage the remaining electronic equipment under the applicable e-waste framework.[5][6]

1.3 How e-waste is generated

E-waste generation is influenced by rapid technological change, product replacement, declining repairability, changing consumer preferences, shorter practical product lifetimes, and the expansion of electronic consumption.[7] Products may also become waste when they are damaged, cannot be economically repaired, are replaced during institutional upgrades, or are rejected during manufacturing. The problem is intensified when functional products are discarded instead of being repaired, refurbished, or reused. However, reuse is environmentally beneficial only when the equipment remains functional and its subsequent management does not simply postpone unsafe disposal.[8]

Global and Indian data

The Global E-waste Monitor 2024, published by the International Telecommunication Union (ITU) and the United Nations Institute for Training and Research (UNITAR), provides a widely recognized global baseline.[9]

- In 2022, the world generated approximately 62 million tonnes of e-waste.
- This represented an average of 7.8 kilograms per person.
- Only 22.3% of the global total was documented as formally collected and recycled in an environmentally sound manner.
- Global e-waste generation increased from 34 million tonnes in 2010 to 62 million tonnes in 2022, while documented formal collection and recycling increased from approximately 8 million to 13.8 million tonnes.[10]

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[4] E-Waste (Management) Rules, 2022, *supra* note 1, sch. I.

[5] The Battery Waste Management Rules, 2022, S.O. 3984(E), Gazette of India, Extraordinary, pt. II, sec. 3(ii), Aug. 24, 2022, rr. 2 and 5, India Code, available at: https://upload.indiacode.nic.in/showfile?actid=AC_CEN_16_18_00011_198629_1517807327582&filename=battery-wastemanagementrules-2022.pdf&type=rule (last visited on Oct. 19, 2026).

[6] E-Waste (Management) Rules, 2022, *supra* note 1, r. 2(a).

[7] International Telecommunication Union and United Nations Institute for Training and Research, "The Global E-waste Monitor 2024" chs. 1 and 3 (2024), available at: https://www.itu.int/dms_pub/itu-d/opb/gen/D-GEN-E_WASTE.01-2024-PDF-E.pdf (last visited on Oct. 19, 2026).

[8] ITU and UNITAR, *supra* note 7, chs. 1 and 3.

[9] ITU and UNITAR, *supra* note 7, ch. 3.

[10] ITU and UNITAR, *supra* note 7, ch. 3 (global time series, 2010–2022).

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These figures demonstrate that documented formal recycling has not kept pace with the growth of e-waste.

India's official statistics also show the scale of the challenge. According to the Ministry of Environment, Forest and Climate Change, based on estimates supplied by the Central Pollution Control Board (CPCB), India generated the following quantities of e-waste under the applicable reporting framework:[11]

Financial year[12]	E-waste generated
2017–18	708,445 tonnes
2018–19	771,215 tonnes
2019–20	1,014,961 tonnes
2020–21	1,346,496 tonnes
2021–22	1,601,155 tonnes

A subsequent parliamentary reply reported that India generated approximately 1,254,287 metric tonnes in 2023–24 and 1,397,956 metric tonnes in 2024–25. It reported that the percentage of e-waste collected, dismantled, and recycled or disposed of was 61.94% and 70.71%, respectively.[13] These figures must be interpreted carefully. The reported percentage is an administrative measure covering collection, dismantling, recycling, or disposal. It should not automatically be treated as the percentage independently verified to have undergone environmentally sound final treatment. The figures also arise from different regulatory reporting periods and estimation methods, so they should not be combined without explaining their respective methodologies.

1.4 Dumping and informal recycling sites

The environmental consequences of e-waste are particularly visible in locations where discarded equipment is accumulated, dismantled, or processed without adequate environmental safeguards. Examples documented in international and academic literature include:

- Guiyu, China: Historically documented as a major informal electronics recycling centre, where unsafe dismantling and material recovery created concerns about heavy-metal contamination and occupational exposure.[14]

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[11] Ministry of Environment, Forest and Climate Change, "Generation of E-waste", Press Information Bureau, July 27, 2023, table on generation from 21 types of EEE, available at: https://www.pib.gov.in/Pressreleaseshare.aspx?PRID=1943201&lang=2&reg=48 (last visited on Oct. 19, 2026).

[12] Ministry of Environment, Forest and Climate Change, "Generation of E-waste", Press Information Bureau, July 27, 2023, table on generation from 21 types of EEE, available at: https://www.pib.gov.in/Pressreleaseshare.aspx?PRID=1943201&lang=2&reg=48 (last visited on Oct. 19, 2026). Figures rounded to whole tonnes.

[13] Ministry of Environment, Forest and Climate Change, "Parliament Question: E-waste processing management", Press Information Bureau, July 24, 2025, tables on generation, processing percentages and registered recyclers, available at: https://www.pib.gov.in/PressReleasePage.aspx?PRID=2147876&lang=2&reg=3 (last visited on Oct. 19, 2026).

[14] Xia Huo, Lin Peng, *et al.*, "Elevated blood lead levels of children in Guiyu, an electronic waste recycling town in China" 115 *Environmental Health Perspectives* 1113–1117 (2007), available at: https://pubmed.ncbi.nlm.nih.gov/17637931/ (last visited on Oct. 19, 2026).

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- Agbogbloshie and surrounding areas of Accra, Ghana: International reporting and research have documented unsafe electronic waste processing, metal recovery, and burning activities. Agbogbloshie should be understood as a historically significant case study rather than assumed to represent an unchanged present-day dumping site.[15]
- Mandoli, Delhi, India: Academic research has documented heavy-metal contamination in soil, plants, and groundwater around informal e-waste recycling workshops.[16]
- Seelampur and other informal recycling areas in Delhi: These have been associated with the collection and dismantling of discarded electronics, often raising concerns about worker safety, informal processing, and environmental controls.[17]

These examples are not a comprehensive inventory of current dumpsites. Nor do they establish that all e-waste generated in a country is dumped at one location. A critical distinction must be maintained between the amount of e-waste generated, the amount handled informally, the amount illegally dumped, and the quantity remaining in accumulated waste deposits. These are different measures, and reliable estimates of the last two are often more difficult to obtain. The 62 million tonnes reported globally for 2022 represents annual generation, not the quantity of e-waste debris physically accumulated at dumpsites. It would therefore be misleading to present the global generation figure as the mass of waste currently lying in landfills or informal recycling locations.[18]

1.5 Environmental and health consequences

A. Soil contamination

Unsafe dismantling, open burning, and inappropriate treatment can release heavy metals and other hazardous substances into the soil. These substances may persist, accumulate, or enter plants and food chains depending on their chemical form and local environmental conditions.[19] A study of informal e-waste recycling in the Mandoli industrial area of Delhi reported elevated concentrations of several metals in surface soil compared with a reference site. The reported lead concentration in soil from the recycling areas reached 2,645.31 mg/kg. The study also found elevated metal concentrations in native plants and concerns about groundwater quality.[20] Such findings demonstrate the need for site-specific environmental testing and remediation. They do not establish that every informal recycling site has the same contamination profile.

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[15] World Health Organization, *supra* note 3.

[16] Jatindra Kumar Pradhan and Sudhir Kumar, "Informal e-waste recycling: environmental risk assessment of heavy metal contamination in Mandoli industrial area, Delhi, India" 21 *Environmental Science and Pollution Research* 7913–7928 (2014), doi:10.1007/s11356-014-2713-2, available at: https://pubmed.ncbi.nlm.nih.gov/24652574/ (last visited on Oct. 19, 2026).

[17] Diksha Singhal, Tanica Lyngdoh, *et al.*, "Knowledge, Attitude and Practice Study of Health Risks Among E-waste Recyclers in Delhi" 11(29) *Journal of Health and Pollution* 210306 (2021), available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC8009644/ (last visited on Oct. 19, 2026).

[18] ITU and UNITAR, *supra* note 7, ch. 3.

[19] World Health Organization, *supra* note 3.

[20] Pradhan and Kumar, *supra* note 16, 7913–7928 (soil, plant and groundwater findings).

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B. Water pollution

Contaminants released during dismantling or processing may migrate into groundwater, drains, and surface water. Rainwater can carry pollutants from exposed waste into nearby water systems, while inappropriate chemical processing can introduce hazardous substances directly into wastewater.[21] Groundwater contamination is especially concerning where local communities depend on wells or other nearby sources for drinking water or domestic use. The appropriate response may require identifying the contaminants, assessing exposure pathways, restricting unsafe activities, and undertaking scientifically designed remediation.

C. Air pollution

Open burning of wires, plastics, and electronic components can release particulate matter, toxic fumes, and other hazardous pollutants. Inappropriate thermal processing may generate dioxins, furans, and other harmful substances, depending on the materials and conditions involved.[22] Airborne pollution can affect workers directly and expose nearby residents. The risk is heightened when processing occurs in residential areas or where workers lack protective equipment and appropriate ventilation.

D. Human health

The World Health Organization's 2021 report, Children and Digital Dumpsites: E-waste Exposure and Child Health, identifies significant risks associated with informal e-waste recycling. It estimated that as many as 18 million children and adolescents and 12.9 million women may be at risk of adverse health outcomes associated with such activities.[23] The report highlights potential effects involving neurological development, respiratory health, reproductive outcomes, and other bodily systems. Children may be especially vulnerable because of their developing organs, behaviour, and physiological characteristics. Pregnant women and workers exposed to hazardous processing may also face particular risks.[24] These figures refer to people potentially at risk, not confirmed cases of disease caused by e-waste. The precise health consequences depend on the substances involved, intensity and duration of exposure, and other relevant factors.

E. Ecosystems and biodiversity

Pollutants entering soil and water can affect microorganisms, plants, aquatic organisms, and other components of ecosystems. Bioaccumulation and movement through food chains may create longer-term ecological concerns.[25] The consequences can extend beyond the immediate recycling site, particularly where contaminants enter water systems or agricultural land.

[21] Pradhan and Kumar, *supra* note 16.
[22] World Health Organization, *supra* note 3.
[23] World Health Organization, *supra* note 3.
[24] World Health Organization, *supra* note 3.
[25] World Health Organization, *supra* note 3.

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F. Occupational and social consequences

Informal recycling may provide livelihoods for workers who depend on collecting and recovering valuable materials. However, unsafe working conditions can expose them to hazardous substances, burns, cuts, and other occupational injuries.[26] A purely punitive approach to informal activity may undermine livelihoods without necessarily creating safer alternatives. Effective environmental policy must combine enforcement against hazardous practices with accessible formalisation pathways, training, protective equipment, and safer facilities.[27] The environmental consequences of e-waste are therefore not limited to pollution. They also raise questions about who receives economic benefits and who bears the risks.

II. INDIA'S LEGAL FRAMEWORK FOR E-WASTE MANAGEMENT AND LIABILITY

2.1 Statutory framework

India's principal e-waste legislation is the E-Waste (Management) Rules, 2022, notified under the Environment (Protection) Act, 1986, and effective from 1 April 2023.[28][29] The rules replaced the earlier 2016 framework and established an EPR system involving producers, manufacturers, refurbishers, and recyclers.[30]

The wider legal framework also includes:

- Environment (Protection) Act, 1986.[31]
- National Green Tribunal Act, 2010.[32]
- Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, where applicable.[33]
- Battery Waste Management Rules, 2022, for separately regulated waste batteries.[34]

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[26] Singhal *et al.*, *supra* note 17.

[27] World Health Organization, *supra* note 3.

[28] E-Waste (Management) Rules, 2022, *supra* note 1, r. 1(2) and preamble.

[29] The Environment (Protection) Act, 1986 (Act 29 of 1986) (as amended), ss. 6, 8 and 25, India Code, available at: https://www.indiacode.nic.in/bitstream/123456789/1876/4/A1986-29.pdf (last visited on Oct. 19, 2026).

[30] The E-Waste (Management) Rules, 2016, G.S.R. 338(E), Gazette of India, Extraordinary, pt. II, sec. 3(i), Mar. 23, 2016 (superseded), India Code, available at: https://upload.indiacode.nic.in/showfile?actid=AC_RJ_83_1096_00001_00001_1563872109827&filename=e_waste_management_rules_2016.pdf&type=rule (last visited on Oct. 19, 2026).

[31] Environment (Protection) Act, 1986, *supra* note 29.

[32] The National Green Tribunal Act, 2010 (Act 19 of 2010), India Code, available at: https://upload.indiacode.nic.in/showfile?actid=AC_CEN_16_18_00009_201019_1517807326004&filename=a2010-19.pdf&type=actfile (last visited on Oct. 19, 2026).

[33] The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, G.S.R. 395(E), Gazette of India, Extraordinary, pt. II, sec. 3(i), Apr. 4, 2016, rr. 12–16 and schs. III, VI and VIII, India Code, available at: https://upload.indiacode.nic.in/showfile?actid=AC_DH_62_997_00001_00001_1551355913434&filename=hazardous_and_other_wastes_%28management_and_transboundary_movement%29_rule%2C_2016.pdf&type=rule (last visited on Oct. 19, 2026).

[34] Battery Waste Management Rules, 2022, *supra* note 5.

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- Relevant rules, standards, directions, and guidelines issued by competent environmental authorities.

The Environment (Protection) Act, 1986 provides the statutory foundation for the rules and contains enforcement powers and penalties. Section 7 prohibits the discharge or emission of environmental pollutants beyond prescribed standards, while Section 15 provides for penalties for contraventions, subject to the applicable statutory framework.[35] The National Green Tribunal Act, 2010 provides a specialized forum for environmental disputes within its jurisdiction. Section 20 requires the Tribunal to apply the principles of sustainable development, the precautionary principle, and the polluter-pays principle.[36]

2.2 Responsibilities under the E-Waste (Management) Rules, 2022

The allocation of duties is central to determining who bears the cost of e-waste.

Manufacturers: Rule 5 requires manufacturers to register, collect e-waste generated during manufacturing, ensure its recycling or disposal through appropriate channels, and submit prescribed returns.[37]

Producers: Rule 6 requires producers to register, fulfil their EPR targets through the prescribed system, undertake awareness activities, and file the required returns.[38]

Refurbishers: Rule 7 requires registration and the transfer of e-waste generated during refurbishment to registered recyclers, with information recorded through the prescribed portal.[39]

Bulk consumers: Rule 8 requires bulk consumers to ensure that e-waste generated by them is handed over only to registered producers, refurbishers, or recyclers, as provided by the rules.[40]

Recyclers: Rule 9 requires registration, compliance with CPCB standards and guidelines, proper management of residues, recordkeeping, reporting, and the use of authorized treatment, storage, and disposal facilities for relevant recycling residues.[41][42]

These duties are not interchangeable. A producer's EPR obligation does not eliminate a recycler's duty to operate safely, and a bulk consumer's duty to transfer waste through permitted channels does not automatically make that consumer liable for all later environmental damage.

[35] Environment (Protection) Act, 1986, *supra* note 29, ss. 7, 14A, 15 and 15C–15F.

[36] National Green Tribunal Act, 2010, *supra* note 32, ss. 14–15, 17–18 and 20.

[37] E-Waste (Management) Rules, 2022, *supra* note 1, r. 5.

[38] E-Waste (Management) Rules, 2022, *supra* note 1, r. 6 and schs. III–IV.

[39] E-Waste (Management) Rules, 2022, *supra* note 1, r. 7.

[40] E-Waste (Management) Rules, 2022, *supra* note 1, r. 8.

[41] E-Waste (Management) Rules, 2022, *supra* note 1, r. 9.

[42] The E-Waste (Management) Second Amendment Rules, 2023, G.S.R. 534(E), July 24, 2023, rr. 2–5, India Code, available at: https://upload.indiacode.nic.in/showfile?actid=AC_CEN_16_18_00011_198629_1517807327582&filename=e_waste_second_amendment_rules_2023.pdf&type=rule (last visited on Oct. 19, 2026).

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2.3 Step-by-step legal procedure for e-waste disposal in India

The 2022 Rules primarily regulate specified actors through registration, EPR, and recycling obligations. They do not prescribe one identical transaction procedure for every household and business. The following sequence describes the principal compliant route under the framework.

Step 1: Identify and segregate discarded equipment

Once equipment is discarded or rejected, it should be separated from ordinary waste and managed according to its classification. Items covered by Schedule I fall within the e-waste framework, subject to the rules' exclusions. Waste batteries and other separately regulated components must be handled under the applicable legislation.[43] The purpose of segregation is to prevent electronic waste from entering ordinary municipal waste streams where it may be broken, burned, or disposed of without appropriate safeguards.

Step 2: Determine whether reuse or refurbishment is appropriate

Functional equipment may be reused or refurbished where this is technically and legally appropriate. Refurbishment can extend product life and delay the generation of waste. However, refurbishment does not authorise the unsafe disposal of defective components. Rule 7 requires refurbishers to transfer e-waste generated during their activities to registered recyclers and upload the relevant information.[44]

Step 3: Transfer the equipment through an appropriate channel

For households, appropriate routes may include producer take-back arrangements, authorised collection arrangements, or registered recycling channels available locally. Bulk consumers have a specific duty under Rule 8 to hand over their e-waste only to registered producers, refurbishers, or recyclers, as permitted by the rule.[45]

Producers and other regulated entities must use the prescribed system and comply with their applicable duties. The legal framework should not be interpreted as permitting an unregistered scrap dealer to conduct regulated recycling simply because it offers collection services.

Step 4: Ensure registered and traceable handling

Rule 4 establishes the registration requirement for manufacturers, producers, refurbishers, and recyclers. The rules prohibit the relevant registered entities from conducting business with unregistered entities in the categories specified by the provision.[46] Registration supports traceability and regulatory supervision. The CPCB portal provides the institutional mechanism for the prescribed registration, EPR, and reporting functions. Registration alone, however, is not proof that every environmental standard has been met. Authorities must also verify actual operations and compliance.

[43] E-Waste (Management) Rules, 2022, *supra* note 1, r. 2 and sch. I.
[44] E-Waste (Management) Rules, 2022, *supra* note 1, r. 7(2).
[45] E-Waste (Management) Rules, 2022, *supra* note 1, r. 8.
[46] E-Waste (Management) Rules, 2022, *supra* note 1, r. 4(1)–(4).

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Step 5: Dismantling and recycling

Recycling must be undertaken in accordance with applicable CPCB standards and guidelines. Recyclers are required to maintain records and manage non-recyclable fractions and residues appropriately.[47] The objective is to recover valuable materials while preventing hazardous substances from being released into the environment. Informal dismantling, open burning, uncontrolled chemical extraction, and unauthorized dumping are incompatible with environmentally sound management where they contravene applicable legal requirements.

Step 6: Manage residues and final disposal

Not every component can be recovered economically or safely through ordinary recycling. Relevant residues must be sent to appropriate authorized treatment, storage, and disposal facilities in accordance with the applicable law. Rule 9 specifically addresses the management of residues generated during recycling. This is an important element of liability because transferring recyclable materials does not remove the duty to manage hazardous residual fractions properly.[48]

Step 7: Recordkeeping, reporting, and verification

Manufacturers, producers, refurbishers, and recyclers must fulfil the applicable reporting and recordkeeping requirements. Under Rules 13 and 14, EPR obligations are implemented through the portal and the prescribed certificate mechanism.[49] The producer may use third-party organizations or other permitted arrangements to help fulfil its duties. Nevertheless, Rule 13(1) expressly retains the EPR obligation with the producer.[50] This provision is important because outsourcing collection or recycling does not, by itself, transfer the producer's statutory EPR responsibility.

2.4 Allocation of liability in India

India's framework distributes responsibility according to the actor's role.

Producers bear EPR obligations. Manufacturers must manage manufacturing-generated e-waste. Refurbishers must transfer their e-waste to registered recyclers. Bulk consumers must use the specified registered channels. Recyclers must operate in accordance with the applicable standards and ensure proper management of residues.[51] Rule 22 provides for environmental compensation in specified cases of violation. Registration may also be cancelled for relevant violations, subject to the prescribed procedure.[52] The Environment (Protection) Act provides broader enforcement powers. Section 15, as amended by the Jan Vishwas (Amendment of Provisions) Act, 2023, must be read with the applicable enforcement and adjudication provisions when considering penalties

[47] E-Waste (Management) Rules, 2022, *supra* note 1, r. 9(2)–(6).
[48] E-Waste (Management) Rules, 2022, *supra* note 1, r. 9(3)–(5).
[49] E-Waste (Management) Rules, 2022, *supra* note 1, rr. 5–7, 9 and 13–14.
[50] E-Waste (Management) Rules, 2022, *supra* note 1, r. 13(1).
[51] E-Waste (Management) Rules, 2022, *supra* note 1, rr. 5–9.
[52] E-Waste (Management) Rules, 2022, *supra* note 1, rr. 4(5) and 22.

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for contraventions.[53][54] Environmental compensation, statutory penalties, and compensation for an injured person are distinct legal concepts. Payment of a regulatory amount should not automatically be treated as proof that all environmental damage has been restored or all individual claims have been resolved.[55]

2.5 Relevant Indian case law

A. Vellore Citizens' Welfare Forum v. Union of India[56]

The Supreme Court recognized the polluter-pays principle and precautionary principle as important elements of Indian environmental law. The judgment is relevant to the proposition that polluting industries should bear the cost of measures required to remedy environmental damage. Although the case concerned industrial pollution rather than e-waste specifically, its principles are relevant when analyzing the legal allocation of e-waste remediation costs.

B. Indian Council for Enviro-Legal Action v. Union of India[57]

The Supreme Court addressed the responsibility of polluting industries for the cost of remedial measures. The judgment supports the proposition that the financial consequences of environmental damage should not simply be transferred to public authorities or local communities. Its relevance to e-waste lies in the general legal principles governing remediation and polluter responsibility.

C. M.C. Mehta v. Union of India[58]

The Oleum Gas Leak case established the principle of absolute liability for enterprises engaged in hazardous or inherently dangerous activities. The case provides an important background to Indian environmental liability, but absolute liability should not be assumed to apply automatically to every e-waste dispute. Its application depends on the nature of the activity and the relevant facts and law.

D. M.C. Mehta v. Union of India, W.P. (C) No. 13029/1985, proceedings concerning burning of e-waste in Delhi/NCR

Supreme Court proceedings in December 2023 included applications concerning the burning of e-waste in Delhi/NCR within the broader continuing environmental litigation. These proceedings

[53] The Jan Vishwas (Amendment of Provisions) Act, 2023 (Act 18 of 2023), s. 2 and sch., entry 24 (amendments to the Environment (Protection) Act, 1986), available at: https://prgi.gov.in/sites/default/files/2023-12/jan_vishwas_act.pdf (last visited on Oct. 19, 2026). For the amended provisions and amendment annotations, see the Environment (Protection) Act, 1986 (Act 29 of 1986), ss. 14A–15F, India Code, available at: https://www.indiacode.nic.in/bitstream/123456789/1876/4/A1986-29.pdf (last visited on Oct. 19, 2026).

[54] The E-Waste (Management) Second Amendment Rules, 2024, r. 2 (substituting r. 23), India Code, available at: https://upload.indiacode.nic.in/showfile?actid=AC_CEN_16_18_00011_198629_1517807327582&filename=e-waste_%28management%29_second_amendment_rules%2C_2024.pdf&type=rule (last visited on Oct. 19, 2026).

[55] The National Green Tribunal Act, 2010 (Act 19 of 2010), ss. 15 and 17 (relief, compensation and restitution), India Code, *supra* note 32; E-Waste (Management) Rules, 2022, r. 22(4), *supra* note 1.

[56] (1996) 5 SCC 647, paras. 11–14.

[57] (1996) 3 SCC 212, paras. 60–67.

[58] (1987) 1 SCC 395, paras. 31–32.

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illustrate that e-waste burning has been raised as a concrete environmental enforcement concern.[59] They should be cited as proceedings relating to the issue, not misrepresented as a final judgment establishing every alleged fact or conclusively determining liability for all e-waste burning.

2.6 Evidence of implementation challenges

Official data show that India's e-waste system is expanding, but they also reveal the need for careful assessment of the distinction between recorded processing and environmentally sound outcomes. According to a parliamentary reply published in July 2025, India reported approximately 1.40 million tonnes of e-waste generation in 2024–25, with 70.71% reported as collected, dismantled, and recycled or disposed of. The same reply listed registered recyclers in 19 states.[60] The data indicate a substantial regulated processing system, but they do not independently establish that all unaccounted-for e-waste was illegally dumped or that every recorded quantity was treated to the same environmental standard.

The more defensible concern is that regulators need to ensure traceability from collection to final treatment, verify the actual recycling process, and identify waste streams that remain outside formal reporting. The Mandoli study provides empirical evidence of contamination associated with informal recycling practices. The WHO's report on children and digital dumpsites provides further evidence of the health risks associated with unsafe e-waste handling.[6162] These sources establish the seriousness of the environmental problem. They do not, without further site-specific evidence, establish that every instance of contamination results from a particular regulatory failure or that a specific producer is liable for it.

III. THE EUROPEAN UNION'S LEGAL FRAMEWORK

3.1 Overview

The European Union is a political and economic union whose member states implement common legislation within the framework of EU law. In the e-waste context, the central instrument is Directive 2012/19/EU on Waste Electrical and Electronic Equipment, commonly known as the WEEE Directive.[63] The Directive aims to protect human health and the environment by preventing

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[59] M.C. Mehta v. Union of India, W.P. (C) No. 13029 of 1985, Supreme Court, order dated Nov. 21, 2023, p. 16, "Burning of E-waste in Delhi/NCR", available at: https://api.sci.gov.in/supremecourt/1985/63998/63998_1985_2_2_48536_Order_21-Nov-2023.pdf (last visited on Oct. 19, 2026). See also Supreme Court, office report dated Feb. 27, 2024, recording proceedings of Dec. 13, 2023, available at: https://api.sci.gov.in/officereport/1985/63998/63998_1985_2024-02-27.pdf (last visited on Oct. 19, 2026).

[60] Ministry of Environment, Forest and Climate Change, *supra* note 13.

[61] Pradhan and Kumar, *supra* note 16.

[62] World Health Organization, *supra* note 3.

[63] Directive 2012/19/EU of the European Parliament and of the Council of July 4, 2012 on waste electrical and electronic equipment (WEEE), OJ L 197, July 24, 2012, p. 38 (as amended; consolidated text of Apr. 8, 2024), EUR-Lex, arts. 1–3, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:02012L0019-20240408 (last visited on Oct. 19, 2026).

or reducing the adverse impacts of e-waste generation and management. It promotes separate collection, appropriate treatment, recovery, recycling, and more efficient use of resources. Because a directive requires implementation through national legal systems, enforcement arrangements and practical performance can vary among member states.[64]

3.2 Scope of the WEEE Directive

The Directive adopts an open-scope approach for electrical and electronic equipment, subject to specified exclusions. Its scope includes a broad range of electronic and electrical products, rather than being confined to computers and mobile phones.[65] This helps address the changing nature of electronic products and the growth of equipment categories that may become waste as technology develops. The Directive operates alongside other EU legislation, including the Restriction of Hazardous Substances framework, general waste legislation, and waste-shipment rules.[66]

3.3 Step-by-step procedure for WEEE management

Step 1: Separate collection

WEEE must be collected separately from unsorted municipal waste. Member states must establish appropriate collection systems and ensure that consumers can return relevant equipment through the available arrangements.[67] Separate collection reduces the risk that electronic products will enter disposal streams in which hazardous components cannot be appropriately managed.

Step 2: Collection facilities and take-back arrangements

Article 5 requires member states to establish appropriate collection systems. Retailers and distributors have specified take-back obligations under the Directive, including the one-for-one return principle for relevant equipment and arrangements for small WEEE under the applicable conditions.[68] These mechanisms seek to make the lawful return of discarded electronics accessible to consumers.

Step 3: Registration and producer responsibility

Producers must register and comply with applicable reporting requirements under Article 16 and the relevant national implementing rules.[69] Producer responsibility is not limited to issuing

[64] Directive 2012/19/EU, *supra* note 63, arts. 24–25.

[65] Directive 2012/19/EU, *supra* note 63, art. 2 and annexs. III–IV.

[66] Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment, OJ L 174, July 1, 2011, p. 88, arts. 1–4, EUR-Lex, available at: https://eur-lex.europa.eu/eli/dir/2011/65/oj (last visited on Oct. 19, 2026). Directive 2008/98/EC on waste, OJ L 312, Nov. 22, 2008, p. 3, arts. 4, 8 and 13, EUR-Lex, available at: https://eur-lex.europa.eu/eli/dir/2008/98/oj (last visited on Oct. 19, 2026).

[67] Directive 2012/19/EU, *supra* note 63, art. 5(1)–(2).

[68] Directive 2012/19/EU, *supra* note 63, art. 5(2)(b)–(c).

[69] Directive 2012/19/EU, *supra* note 63, art. 16 and annex X.

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voluntary guidance. The Directive requires member states to ensure financing arrangements for the collection, treatment, recovery, and environmentally sound disposal of WEEE.[70]

Step 4: Appropriate treatment

Article 8 requires WEEE collected separately to undergo proper treatment. Treatment must comply with the applicable requirements and technical standards, including those relating to the removal of specified substances, components, and materials.[71] The purpose is to prevent hazardous fractions from contaminating the environment while enabling safe recovery of valuable resources.

Step 5: Recovery and recycling targets

The Directive establishes collection, recovery, and recycling targets. Article 7 provides for collection targets, while Article 11 and Annex V address recovery targets.[72] The collection target framework includes the general target of 65% of the average weight of electrical and electronic equipment placed on the market in the preceding three years, or 85% of WEEE generated, subject to the Directive's calculation rules and applicable provisions.[73] These targets are intended to improve collection and recovery. However, the existence of a target does not establish that every item is safely treated, nor does it automatically determine liability for environmental damage.

Step 6: Financing of waste management

Articles 12 and 13 address financing.

For WEEE from private households, producers must provide at least for the financing of collection, treatment, recovery, and environmentally sound disposal in accordance with the Directive's provisions.[74] For WEEE from users other than private households, Article 13 establishes producer-financing duties for relevant products placed on the market after the specified date. The Directive also contains arrangements for historical waste.[75] These provisions make the allocation of waste-management costs explicit and provide a basis for financing end-of-life obligations.

Step 7: Monitoring, enforcement, and reporting

Member states must establish appropriate enforcement mechanisms and penalties for infringements. They also report information required by the Directive and implement the relevant national registration and compliance systems.[76] The EU framework thus combines common legal obligations with national administration, inspections, reporting, and enforcement.

[70] Directive 2012/19/EU, *supra* note 63, arts. 12–13.
[71] Directive 2012/19/EU, *supra* note 63, art. 8 and annexs. VII–VIII.
[72] Directive 2012/19/EU, *supra* note 63, arts. 7 and 11 and annex V.
[73] Directive 2012/19/EU, *supra* note 63, art. 7(1) and (3).
[74] Directive 2012/19/EU, *supra* note 63, art. 12(1)–(3).
[75] Directive 2012/19/EU, *supra* note 63, art. 13.
[76] Directive 2012/19/EU, *supra* note 63, arts. 16 and 22–23.

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3.4 Environmental liability beyond WEEE

The WEEE Directive must be distinguished from Directive 2004/35/EC on Environmental Liability with Regard to the Prevention and Remedying of Environmental Damage.[77] The Environmental Liability Directive establishes a framework for preventing and remedying specified categories of environmental damage based on the polluter-pays principle. Its scope is subject to its definitions, conditions, exclusions, and national implementation. It does not create a universal compensation regime for every form of pollution or every personal injury. The legal basis for a claim depends on the type of damage and the applicable legislation.[78] WEEE governs waste-management obligations, whereas the Environmental Liability Directive addresses prevention and remediation of specified environmental damage. These frameworks interact, but they perform different functions.

3.5 Transboundary waste shipments

International movements of e-waste introduce additional liability concerns. The Basel Convention's e-waste amendments took effect on 1 January 2025 for parties bound by them, expanding prior informed consent controls for covered transboundary movements.[79] The European Union has also updated its waste-shipment framework through Regulation (EU) 2024/1157 and related measures.[80] The European Commission states that, from 1 January 2025, exports of e-waste from the EU to non-OECD countries are prohibited, while exports to OECD countries are subject to prior informed consent; imports into the EU and relevant shipments within the EU are also subject to the applicable consent framework, with specified exceptions and transitional arrangements.[81] These rules are designed to strengthen control over waste movements and reduce the risk of waste being transferred to jurisdictions unable to manage it safely. However, shipment restrictions do not themselves resolve every question concerning environmental remediation or compensation after damage has occurred. Those issues remain dependent on the relevant legal framework and facts.

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[77] Directive 2004/35/EC of the European Parliament and of the Council of Apr. 21, 2004 on environmental liability with regard to the prevention and remedying of environmental damage, OJ L 143, Apr. 30, 2004, p. 56, arts. 1–4, 5–8 and 12–13, EUR-Lex, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32004L0035 (last visited on Oct. 19, 2026).

[78] Directive 2004/35/EC, *supra* note 77, art. 3(3) and recital 14 (private compensation).

[79] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989, arts. 4 and 6; Secretariat of the Basel Convention, "E-waste Amendments", decision BC-15/18 (2022), amending annexs. II, VIII and IX, effective Jan. 1, 2025 for parties bound by them, available at: https://www.basel.int/tabid/10103 (last visited on Oct. 19, 2026).

[80] Regulation (EU) 2024/1157 of the European Parliament and of the Council of Apr. 11, 2024 on shipments of waste, OJ L, 2024/1157, Apr. 30, 2024, arts. 85–86 (transitional arrangements and application dates), EUR-Lex, available at: https://eur-lex.europa.eu/eli/reg/2024/1157/oj (last visited on Oct. 19, 2026).

[81] European Commission, "Waste shipments", sections "Objectives and aims" and "New rules on e-waste", available at: https://environment.ec.europa.eu/topics/waste-and-recycling/waste-shipments_en (last visited on Oct. 19, 2026).

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3.6 EU data and continuing challenges

The European Commission reported that approximately five million tonnes of e-waste were collected in the EU in 2022, equivalent to 11.2 kilograms per person.[82] This figure refers to collected WEEE, not necessarily the total amount generated or the amount ultimately recycled in environmentally sound conditions. It should therefore not be compared directly with India's total generation figure. In July 2025, the European Commission published an evaluation of the WEEE Directive, examining whether the legislation remained fit for purpose and whether a review was necessary. The evaluation itself demonstrates that the EU framework continues to face questions concerning implementation and effectiveness.[83] The existence of detailed legislation does not eliminate challenges such as insufficient collection, illegal shipments, inconsistent implementation, and the difficulty of ensuring that all waste is treated in accordance with applicable standards.[84]

IV. COMPARATIVE ANALYSIS OF INDIA AND THE EUROPEAN UNION

4.1 Similarities

India and the European Union recognize the environmental risks associated with e-waste and impose obligations intended to promote separate collection, recycling, and environmentally sound management. Both systems use producer-responsibility mechanisms to allocate at least part of the financial and organizational burden of end-of-life management to producers.[8586] Both also operate within the wider framework of international environmental law, including the Basel Convention, and rely on registration, reporting, regulatory oversight, and enforcement mechanisms.[87] The two jurisdictions therefore share a common objective: preventing e-waste from being managed in ways that threaten human health and the environment.

4.2 Differences in regulatory structure

India's 2022 Rules establish a centralized EPR framework through the CPCB portal. Producer obligations are linked to prescribed recycling targets and certificates generated through the regulated system.[88] The EU's WEEE Directive establishes common obligations across member states, but implementation takes place through national legislation, producer registers, collection

[82] European Commission, "Waste from Electrical and Electronic Equipment (WEEE)", statistics for 2022, available at: https://environment.ec.europa.eu/topics/waste-and-recycling/waste-electrical-and-electronic-equipment-weee_en (last visited on Oct. 19, 2026).

[83] European Commission, "Staff Working Document: Evaluation of Directive 2012/19/EU on waste electrical and electronic equipment (WEEE)" (July 2, 2025), available at: https://environment.ec.europa.eu/publications/staff-working-document-evaluation-directive-201219eu-waste-electrical-and-electronic-equipment-weee_en (last visited on Oct. 19, 2026).

[84] European Commission, *supra* note 83.

[85] E-Waste (Management) Rules, 2022, *supra* note 1, rr. 6, 13 and 14.

[86] Directive 2012/19/EU, *supra* note 63, arts. 12–13.

[87] Basel Convention Secretariat, *supra* note 79.

[88] E-Waste (Management) Rules, 2022, *supra* note 1, rr. 4, 6 and 13–14.

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systems, and enforcement authorities.[89] The distinction is institutional rather than absolute. Both systems rely on national or domestic regulatory implementation, but the EU operates through a multi-level legal framework involving the EU institutions and member states.

4.3 Producer responsibility and financing

India's rules place the EPR obligation on producers and require fulfilment through the prescribed system. Third parties may assist, but the producer remains responsible for meeting its EPR obligations under Rule 13.[90] The EU framework expressly addresses financing for WEEE from households and non-household users through Articles 12 and 13.[91] Both systems seek to prevent the financial burden of end-of-life management from resting exclusively on local authorities or consumers. However, the precise allocation of historical waste costs, the operation of compliance mechanisms, and the relationship between producer obligations and other liability regimes differ. A meaningful comparison must examine actual implementation and legal scope rather than presume that one model necessarily produces better environmental outcomes.

4.4 Environmental remediation and compensation

India's EPR system includes environmental compensation for specified non-compliance. Broader environmental legislation and judicial principles also provide a basis for addressing pollution and remedial costs.[9293] In the EU, the WEEE Directive addresses waste-management obligations, while the Environmental Liability Directive provides a separate framework for preventing and remedying specified environmental damage.[94] This difference is important. A producer's recycling obligation is not necessarily equivalent to a duty to restore a contaminated site, and payment of an administrative environmental amount is not necessarily equivalent to compensating every person affected by pollution. The comparative inquiry should therefore assess whether each legal system identifies the responsible actor, determines the appropriate remedial obligation, and provides effective enforcement.

4.5 Environmental justice and access to remedies

Environmental justice requires that communities affected by pollution have access to environmental information, participation in relevant decisions, and effective legal remedies.[95] In India, informal recycling and limited access to formal waste-management systems may complicate

[89] Directive 2012/19/EU, *supra* note 63, arts. 5, 16 and 24.

[90] E-Waste (Management) Rules, 2022, *supra* note 1, r. 13(1).

[91] Directive 2012/19/EU, *supra* note 63, arts. 12–13.

[92] E-Waste (Management) Rules, 2022, *supra* note 1, r. 22.

[93] National Green Tribunal Act, 2010, *supra* note 32, ss. 15, 17 and 20.

[94] Directive 2004/35/EC, *supra* note 77, arts. 2–3 and 5–8.

[95] United Nations Conference on Environment and Development, Rio Declaration on Environment and Development, UN Doc. A/CONF.151/26 (vol. I) (1992), principle 10, available at: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf (last visited on Oct. 19, 2026). Directive 2004/35/EC, arts. 12–13, *supra* note 77.

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enforcement and the protection of workers. The policy challenge is to improve environmental standards without simply shifting the costs of transition onto vulnerable workers.[96] In the EU, the more developed collection and financing framework does not eliminate illegal handling, insufficient collection, or uneven implementation. Access to remedies also depends on the applicable national law and the scope of the relevant EU instrument.[97][98] Both systems therefore require effective monitoring, accessible complaint mechanisms, and appropriate remedies. Their differences in institutional capacity, waste-sector structure, and regulatory implementation must be considered when drawing lessons from one jurisdiction for the other.

4.6 Critical assessment

The central finding of the comparison is that EPR and environmental liability are related but distinct legal mechanisms. EPR allocates defined responsibilities for end-of-life management. Environmental liability addresses responsibility for particular environmental damage under the applicable legal framework. Environmental justice asks whether the combined system prevents harm, allocates costs fairly, and provides meaningful remedies to affected people.

The Indian framework's reliance on portal-based compliance and recycling certificates offers traceability and a mechanism for assigning producer obligations. Its effectiveness nevertheless depends on verification of actual recycling, management of residues, enforcement against unlawful activity, and the treatment of damage that is not resolved merely by meeting recycling targets.[99] The EU framework provides detailed rules on collection and financing and operates alongside a separate environmental liability regime. However, it also faces collection and enforcement challenges, and its environmental liability provisions do not apply to every category of pollution or injury.[100][101] Neither jurisdiction should therefore be assessed solely by the number of legal provisions it has enacted. The relevant question is whether the legal framework, as implemented, produces environmentally sound outcomes and allocates responsibility in a manner consistent with the polluter-pays principle.

V. RECOMMENDATIONS FOR IMPROVING INDIA'S E-WASTE LIABILITY FRAMEWORK

5.1 Strengthen traceability from collection to final treatment

India should strengthen the verification of e-waste movements from collection through dismantling, recycling, and final disposal. Digital records should be supported by independent checks, facility inspections, and reconciliation of input and output quantities. The objective should

[96] Singhal *et al.*, *supra* note 17.
[97] European Commission, *supra* note 83.
[98] Directive 2004/35/EC, *supra* note 77, arts. 3 and 12–13.
[99] E-Waste (Management) Rules, 2022, *supra* note 1, rr. 9(5), 13–14 and 22–24.
[100] Directive 2012/19/EU, *supra* note 63, arts. 5 and 12–13.
[101] Directive 2004/35/EC, *supra* note 77, arts. 2–4.

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be to ensure that registered collection and recycling activities correspond to actual, environmentally sound treatment rather than merely recorded transactions.

5.2 Distinguish EPR compliance from liability for environmental damage

The law and its implementation should clearly distinguish the fulfilment of recycling targets from responsibility for contamination and remediation. Where actual environmental damage is attributable to a regulated activity, the applicable remediation obligations should be identified separately. A recycling certificate should not be treated as proof that all environmental consequences have been resolved.

5.3 Improve financial safeguards for remediation

Appropriate insurance, financial guarantees, or other legally supported mechanisms could reduce the risk that environmental restoration becomes impossible when a responsible operator becomes insolvent or cannot meet its obligations.[102] Such mechanisms should complement, rather than automatically replace, the liability of identifiable polluters. Their design should also account for the scale of risk and avoid disproportionate burdens on actors who are not responsible for the relevant damage.

5.4 Strengthen enforcement against unsafe informal processing

Enforcement should target hazardous practices such as open burning, uncontrolled chemical extraction, and illegal dumping. However, informal workers should not be treated merely as enforcement targets. Safer facilities, training, protective equipment, access to formal recycling networks, and realistic transition arrangements are necessary to reduce environmental harm without creating avoidable social hardship.[103]

5.5 Improve public participation and access to remedies

Affected communities should have access to environmental information, accessible complaint mechanisms, and meaningful opportunities to participate in decisions concerning remediation. Where legally justified, procedures for environmental claims should be sufficiently accessible to avoid making remedies practically unavailable to people who lack financial resources or technical expertise.[104] Regulatory authorities should also publish clearer information about enforcement actions, remediation orders, and compliance outcomes, subject to legitimate confidentiality requirements.

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[102] For the distinction between waste-management financing and environmental-damage security, see Directive 2012/19/EU, art. 12(3), *supra* note 63; Directive 2004/35/EC, art. 14, *supra* note 77. The proposed safeguards are recommendations, not a claim that a universal e-waste remediation guarantee already exists.

[103] World Health Organization, *supra* note 3.

[104] National Green Tribunal Act, 2010, *supra* note 32, ss. 15, 18 and 19.

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5.6 Improve data quality and environmental monitoring

India should distinguish more clearly between e-waste generated, collected, dismantled, recycled, disposed of, and independently verified as environmentally soundly treated. Environmental monitoring should focus on high-risk recycling and disposal sites, with testing of soil, groundwater, and air where appropriate. Public reporting should identify the methodology, time period, and limitations of the data.[105] Better data would allow policymakers to determine whether the main problems arise from insufficient collection, unregistered processing, unsafe treatment, or failures in remediation.

5.7 Learn from the EU without copying it mechanically

India can draw lessons from the EU's detailed producer-financing provisions, collection systems, registration arrangements, and separation between waste-management obligations and environmental liability.[106] However, the institutional and economic contexts differ. Reforms should therefore be adapted to India's waste-sector structure, administrative capacity, and the importance of informal livelihoods. The goal should not be to reproduce EU legislation word for word. It should be to adopt mechanisms that improve traceability, accountability, environmental restoration, and access to justice within India's own legal framework.

VI. CONCLUSION

E-waste pollution raises fundamental questions about the allocation of environmental costs and the relationship between producer responsibility and environmental justice. The growth of electronic consumption has generated significant quantities of discarded equipment, while unsafe recycling and disposal can damage ecosystems and expose workers and communities to hazardous substances. India's E-Waste (Management) Rules, 2022, as amended, establish an EPR-based system that assigns responsibilities to producers, manufacturers, refurbishers, and recyclers. The European Union's WEEE Directive similarly establishes collection, treatment, recovery, and financing obligations, operating alongside a separate environmental liability framework. The comparison demonstrates that producer responsibility is an important mechanism for organizing and financing e-waste management, but it is not synonymous with comprehensive liability for environmental damage. Collection and recycling obligations must be distinguished from remediation of contaminated sites and compensation for legally recognized injury. India can strengthen its framework by improving traceability, verifying actual treatment, ensuring appropriate financial safeguards, enforcing remediation obligations, and making environmental remedies more accessible. It should also recognize the social consequences of unsafe recycling and develop safer alternatives for workers who depend on the sector. Ultimately, the objective of e-waste law should extend beyond ensuring that discarded electronics enter a registered recycling system. It should ensure that the environmental consequences of electronic consumption are

[105] Pradhan and Kumar, *supra* note 16.

[106] Directive 2012/19/EU, *supra* note 63, arts. 5, 12–13 and 16.

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prevented where possible, remedied where damage occurs, and financed by the actors legally responsible for the relevant harm. Environmental justice requires that the costs of digital progress are not unfairly transferred to vulnerable communities, workers, or the public.