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Global E-Waste Trafficking as Transnational Eco-Crime: Regulatory Arbitrage, Environmental Injustice and the Limits of International Governance

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***Abstract*—The rapid expansion of the digital economy has made waste electrical and electronic equipment (e-waste) one of the world's fastest-growing waste streams, rising from 62 million metric tonnes in 2022 to a projected 82 million by 2030. Discarded electronics occupy an unstable legal and material space because they contain valuable metals alongside toxic substances like lead, mercury, and brominated flame retardants. Drawing on green criminology, doctrinal legal analysis, and evidence from the European Union, the United States, West Africa, Southeast Asia, and India, this chapter examines the transboundary movement of e-waste as a form of transnational environmental crime. Rather than accidental recycling failures, illicit exports are built into global supply chains through misdeclaration, sham reuse claims, transshipment, and shell-company brokerage. These practices shift toxic burdens from wealthy economies onto lower-income communities, where informal dismantling, open burning, and acid leaching cause severe health and ecological damage. The chapter evaluates the Basel Convention's Swiss-Ghanaian E-Waste Amendments, effective from January 2025, which bring both hazardous and non-hazardous e-waste under Prior Informed Consent rules through entries A1181 and Y49. Showing that treaty reform alone cannot overcome weak customs enforcement and vague reuse rules, the study proposes an environmental justice framework combining digital product passports, mandatory functionality testing, intermediary criminal liability, worker formalisation, and polluter-funded remediation.**

***Index Terms*—Basel Convention, e-waste, environmental crime, environmental justice, Extended Producer Responsibility, green criminology, hazardous waste, informal recycling, regulatory arbitrage, transboundary waste movement**

I. INTRODUCTION

Digital capitalism presents itself as dematerialised, clean and frictionless. Yet every smartphone, laptop, server, television, router and battery are the product of mining, smelting, chemical

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processing, energy consumption and global transport. At the end of its life, each device becomes part of a growing stream of electrical and electronic waste. The Global E-waste Monitor 2024 estimates that the world generated approximately 62 million metric tonnes of e-waste in 2022, and this massive volume reflects an 82% increase since 2010, while documented formal collection and recycling remained far below the total generated volume.[1] By 2030, annual generation is projected to reach approximately 82 million metric tonnes.[2]

E-waste is economically attractive because it contains copper, aluminium, gold, silver, palladium and other recoverable materials. It is also dangerous because it contains hazardous constituents such as lead in cathode ray tube glass and solder, mercury in lamps and switches, cadmium in batteries and semiconductors, and brominated flame retardants in plastics.[3] When treated in environmentally sound facilities, these materials can be depolluted and recovered under controlled conditions. When processed informally through open burning, crude dismantling or acid leaching, they generate severe toxic exposure.

The central criminological problem is that lawful commerce and unlawful disposal are often interwoven. A container may be described as containing "used computers", "second-hand televisions", "mixed household goods" or "metal scrap", while in reality holding broken monitors, stripped printed circuit boards, obsolete cables and non-functional appliances. Traffickers exploit the ambiguous boundary between used electrical and electronic equipment intended for reuse and waste electrical and electronic equipment intended for disposal or recovery. This boundary has been one of the most contested questions in international waste law.

The chapter argues that global e-waste trafficking should be understood as transnational eco-crime. It is transnational because it crosses borders through maritime, road and customs systems. It is ecological because the harm is inflicted on land, air, water, bodies and future generations. It is criminal not merely because some shipments violate customs or waste-control rules, but because the trade systematically externalises foreseeable toxic harms onto communities with the least capacity to resist them.

II. CONCEPTUAL FRAMEWORK: GREEN CRIMINOLOGY AND ECOLOGICAL UNEQUAL EXCHANGE

Traditional criminal law often focuses on conduct expressly prohibited by statute. Environmental harm, however, frequently occurs in regulatory grey zones where actors exploit uncertainty, weak enforcement, or divergent national standards. Green criminology therefore expands the field of

[1]C.P. Baldé, R. Kuehr, et.al., The Global E-waste Monitor 2024: Electronic Waste Rising, but Recycling Falling Behind 19-22 (International Telecommunication Union and United Nations Institute for Training and Research, Geneva/Bonn, 2024).

[2]Id. at 24.

[3]World Health Organization, "Children and Digital Dumpsites: E-waste Exposure and Child Health" 8-17 (2021).

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inquiry from formally criminalised acts to ecological harm, environmental injustice and state-corporate misconduct.[4]

E-waste trafficking fits within this expanded framework in three ways. First, it is a form of secondary green crime because it involves fraudulent paperwork, customs misdeclaration, breach of waste-control procedures, bribery, false certification and evasion of inspection. Secondly, it produces primary ecological harm at destination sites through direct contamination of air, soil, rivers and food chains. Thirdly, it is frequently a state-corporate harm, because private firms benefit from regulatory gaps while states tolerate under-enforcement, weak inspection and low penalties.

The political economy of e-waste reflects the "treadmill of production": economic growth depends on accelerated throughput of raw materials into commodities and then into waste.[5] Planned obsolescence, non-repairable design, locked software ecosystems, glued batteries and short replacement cycles intensify the volume of discarded electronics.[6] Producers and consumers in affluent economies enjoy the benefits of constant device replacement, while downstream communities bear the toxic costs.

This pattern also reflects ecological unequal exchange. Raw materials extracted from poorer regions are incorporated into high-value consumer electronics and circulated through global markets. At end-of-life, degraded and hazardous residues are often returned to lower-income regions under the guise of recycling, reuse, or charitable donation. The result is a net transfer of economic value upward and a net transfer of ecological harm downward.

Environmental justice scholarship describes such spaces as sacrifice zones: territories where marginalised populations are exposed to disproportionate environmental risk because of class, race, colonial history or geopolitical weakness.[7] E-waste destinations in West Africa, South Asia and Southeast Asia are not passive waste sites. They are labouring communities whose workers recover valuable materials under unsafe conditions because formal employment, protective infrastructure and state support are limited.

III. THE GLOBAL E-WASTE ECONOMY: RESOURCE VALUE AND TOXIC BURDEN

E-waste occupies a dual status. It is both a secondary resource stream and a hazardous waste stream. Printed circuit boards can contain precious metals in concentrations much higher than ordinary ores. Copper cables, aluminium frames and steel casings are valuable. Refurbishment can

[4]Michael J. Lynch, Paul B. Stretesky, et.al., "Defining Green Criminology: Exploring the Nature of Ecological Harm and Environmental Crime" 35 Sociological Spectrum 311 (2015).

[5]Kenneth A. Gould, David N. Pellow and Allan Schnaiberg, The Treadmill of Production: Injustice and Unsustainability in the Global Economy 1-18 (Paradigm Publishers, Boulder, 2008).

[6]World Health Organization, supra note 3 at 5-9.

[7]Robert D. Bullard, Dumping in Dixie: Race, Class, and Environmental Quality 1-20 (Westview Press, Boulder, 3rd edn., 2000).

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extend product life and reduce demand for virgin extraction. A blanket hostility to all second-hand electronics trade would therefore be economically and environmentally simplistic.

However, the economic value of e-waste is unevenly distributed. High-value fractions such as copper and gold are recovered, while low-value and hazardous residues—plastic casings containing brominated flame retardants, leaded glass, contaminated dust, sludge and ash—are discarded locally. The informal recycling economy therefore captures part of the recoverable value while leaving workers and residents with the toxic remainder.

Environmentally sound management requires sorting, depollution, controlled shredding, ventilation, emissions capture, wastewater treatment and safe disposal of residues. Such systems require capital investment. Informal systems, by contrast, rely on low-cost labour and externalisation of health and environmental costs. The economic incentive for trafficking lies precisely in this gap: compliant recycling in a high-regulation jurisdiction is expensive, while export to informal recovery chains may be cheap or profitable.

IV. LEGAL ARCHITECTURE: BASEL, BAMAKO, THE EU AND THE REUSE-WASTE BOUNDARY

4.1 The Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, adopted in 1989 and in force from 1992, is the principal global treaty governing transboundary movements of hazardous waste.[8] Its core obligations include minimisation of transboundary movements, environmentally sound management and the Prior Informed Consent procedure. Under article 6, a transboundary movement covered by the Convention may proceed only after notification to, and consent from, the state of import and any transit states.[9] Under article 9, movements without consent, obtained through fraud or resulting in unlawful disposal may constitute illegal traffic.[10] Article 4(3) requires parties to consider illegal traffic in hazardous wastes as criminal.[11]

The original Basel framework struggled with e-waste because it divided electronic waste into hazardous and non-hazardous categories. Earlier Annex VIII entry A1180 covered certain hazardous electrical and electronic assemblies, while Annex IX entry B1110 created space for claims that electronic assemblies were non-hazardous and therefore outside the PIC procedure. Exporters could claim that mixed electronic scrap was non-hazardous, repairable or destined for reuse.

[8]The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1989.

[9]Id., art. 6.

[10]Id., art. 9.

[11]Id., art. 4(3).

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4.2 The Basel Ban Amendment

The Basel Ban Amendment, adopted in 1995 and in force from 2019, prohibits Annex VII parties—OECD members, the European Union and Liechtenstein—from exporting hazardous wastes covered by the amendment to non-Annex VII states for final disposal or recovery.[12] The Ban Amendment is normatively important because it recognises that consent alone may be inadequate where bargaining power is unequal.

Its limits must, however, be stated accurately. It does not bind non-parties. It does not by itself solve South-South waste movements. It also does not automatically eliminate all legal movement of non-hazardous e-waste, although post-2025 Basel amendments now subject non-hazardous e-waste to PIC as "other waste" under Annex II. The Ban Amendment is therefore a significant but incomplete response.

4.3 The 2022 Swiss-Ghanaian E-Waste Amendments

The most important recent development is the 2022 Swiss-Ghanaian E-Waste Amendments to the Basel Convention, adopted by Decision BC-15/18 and effective from 1 January 2025.[13] These amendments created a new legal structure for e-waste.

First, new Annex VIII entry A1181 covers hazardous electrical and electronic waste, including waste containing hazardous components or contaminated by hazardous constituents to the extent that it exhibits hazardous characteristics. Secondly, new Annex II entry Y49 covers electrical and electronic waste not covered by A1181. Thirdly, the earlier reliance on an exemption for non-hazardous electronic assemblies was removed or fundamentally displaced. The effect is that, among Basel parties, transboundary movements of both hazardous and non-hazardous e-waste are subject to the PIC procedure from 1 January 2025.

This is a major legal correction. It reduces the ability of exporters to avoid control by asserting that a shipment is non-hazardous electronic scrap. However, the amendments do not control genuinely functional used electronics intended for direct reuse, because such items are not waste. Thus, the reuse-waste boundary remains central.

4.4 The Reuse-Waste Boundary

The Basel Convention defines waste as substances or objects which are disposed of, intended to be disposed of or required to be disposed of by national law.[14] This definition contains an element of intention and is vulnerable to manipulation. Exporters may describe obsolete, broken or untested equipment as second-hand goods, charitable donations or repairable devices.

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[12]Amendment to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1995, art. 4A.

[13]Conference of the Parties to the Basel Convention, Report of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal on its Fifteenth Meeting, Decision BC-15/18, UN Doc UNEP/CHW.15/28 (June 17, 2022).

[14]The Basel Convention, 1989, art. 2(1).

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The Basel technical guidelines on e-waste and used electrical and electronic equipment attempt to address this issue by using objective indicators: functionality testing, adequate packaging, contracts for legitimate repair, traceability and evidence that the equipment is not destined for disposal.[15] However, unless incorporated into domestic law and enforced by customs authorities, such guidelines remain vulnerable to fraudulent certificates and superficial "power-on" tests.

Courts have also interpreted the concept of waste broadly. In Van de Walle, the European Court of Justice emphasised that the classification of waste depends on objective circumstances and not merely on the holder's description.[16] This approach is important for e-waste because the exporter's claim of intended reuse should not be conclusive where the physical condition, packaging, age, market value and destination indicate disposal.

4.5 Bamako Convention and African Prohibition

The Bamako Convention, adopted by African states in 1991 and in force from 1998, takes a stricter approach by prohibiting the import of hazardous wastes into Africa.[17] It was a response to toxic waste dumping and perceived weaknesses in the Basel regime. However, enforcement remains constrained by limited port inspection capacity, lack of laboratories, corruption risks and dependence on customs revenue.

4.6 European Union Law

The European Union has one of the most developed e-waste regimes. The WEEE Directive imposes Extended Producer Responsibility and sets collection targets, including the target of 65 per cent of the average weight of electrical and electronic equipment placed on the market in the three preceding years or 85 per cent of WEEE generated.[18] The Waste Shipment Regulation implements waste shipment controls and, in its recast form, Regulation (EU) 2024/1157, strengthens traceability and enforcement.[19] Many provisions of the recast regulation apply after a transitional period, so it should not be described as fully replacing the previous regime for all purposes immediately upon publication.

Despite this framework, Europe continues to experience leakage from formal systems. Illegal exports occur through false declarations, under-reporting, informal collection and diversion from authorised treatment facilities.

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[15]Conference of the Parties to the Basel Convention, Technical Guidelines on Transboundary Movements of Electrical and Electronic Waste and Used Electrical and Electronic Equipment, in Particular Regarding the Distinction between Waste and Non-waste under the Basel Convention (Basel Convention Secretariat, Geneva, 2019).

[16]Case C-1/03, Van de Walle and Others, [2004] ECR I-7613.

[17]Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, 1991.

[18]Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on Waste Electrical and Electronic Equipment [2012] OJ L 197/38, art. 7.

[19]Regulation (EU) 2024/1157 of the European Parliament and of the Council of 11 April 2024 on Shipments of Waste [2024] OJ L 2024/1157.

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4.7 United States Law

The United States has signed but not ratified the Basel Convention. It is therefore not a party to the Convention, although Basel parties are restricted in their waste trade with non-parties unless an article 11 agreement or equivalent arrangement applies. U.S. federal regulation of e-waste is narrower than Basel controls. The Resource Conservation and Recovery Act regulate hazardous waste, but many electronic products and components are not treated as hazardous waste when managed as commodities for recycling or reuse.[20]

The U.S. CRT rule provides conditional exclusions for cathode ray tubes destined for recycling or reuse, but it is inaccurate to say that CRT exports are completely unregulated. Exporters of used CRTs for recycling must comply with notification and consent-related requirements administered by the Environmental Protection Agency.[21] Nevertheless, major gaps remain for other electronic equipment, and the absence of Basel ratification creates structural asymmetry in global enforcement.

V. MODUS OPERANDI OF E-WASTE TRAFFICKING

Illicit e-waste trafficking operates through ordinary logistics systems rather than through visibly separate criminal routes. Its methods are commercial, documentary and spatial.

First, traffickers use misclassification. Hazardous e-waste may be declared as second-hand electronics, mixed metal scrap, plastic scrap, household goods or used appliances. Harmonised System codes are used strategically to avoid suspicion.

Secondly, exporters use sham reuse and donation claims. Containers are consigned to schools, charities, churches, NGOs or second-hand traders. Some items may be functional, but large fractions are broken, obsolete or missing essential components. This creates a "Trojan horse" shipment in which usable goods conceal waste.

Thirdly, actors use physical camouflage. Functional or clean-looking equipment may be placed near the container door, while broken CRTs, stripped chassis, loose circuit boards and damaged cables are packed deeper inside.

Fourthly, traffickers use transshipment. Containers may pass through free zones or logistics hubs where bills of lading are changed, origins are obscured and new corporate entities appear as consignors or consignees. This weakens traceability and frustrates take-back obligations.

Fifthly, shell companies and low-capital brokers are used to insulate generators and brand owners. By the time a shipment is intercepted, the exporting entity may be dissolved or insolvent.

The relevant actors include corporate generators, institutional disposal contractors, brokers, freight forwarders, shipping lines, customs agents, destination importers, repair markets and informal dismantlers. The original generator may not personally load a container, but it may benefit from low-cost disposal without adequate downstream audit. Criminal liability should therefore not focus

[20]Resource Conservation and Recovery Act of 1976, 42 U.S.C. § 6901 et seq.

[21]Hazardous Waste Management System; Modification of the Hazardous Waste Program; Cathode Ray Tubes, 71 Fed. Reg. 42928 (July 28, 2006); 40 C.F.R. § 261.39.

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only on the final informal worker. It must move upward to brokers, exporters, compliance schemes and corporate actors who profit from evasion.

VI. JURISDICTIONAL CASE STUDIES

6.1 West Africa: Ghana and Nigeria

West Africa has been a major destination for used electronics and e-waste from Europe and North America. Ghana's Agbogbloshie scrap area became internationally known as an e-waste site. Later scholarship has corrected exaggerated portrayals that treated it as simply the world's largest digital dumping ground, noting that much of the scrap economy also involved domestic and automotive waste.[22] Nevertheless, toxic exposure from burning wires, dismantling appliances and contaminated soils was real.

In 2021, demolition of parts of the Agbogbloshie scrap area displaced workers rather than eliminating the activity. This illustrates a common enforcement failure: punitive clearance may relocate harm into less visible spaces without providing safer livelihoods or infrastructure.

Nigeria is a major hub for used electronics, particularly through Lagos ports and markets such as Alaba International Market and Computer Village. The Person in the Port project found that Nigeria receives substantial quantities of used electrical and electronic equipment, much of which supports legitimate reuse and repair, but a significant fraction is non-functional or not economically repairable.[23] This mixture complicates regulation: policy must not destroy repair economies, but it must prevent importation of disguised waste.

6.2 China and Southeast Asia

For many years, parts of coastal China, particularly Guiyu, were associated with intensive informal e-waste processing. Environmental studies documented heavy-metal contamination and elevated health risks in such areas. China's Green Fence and National Sword policies restricted waste imports and changed global flows. Rather than eliminating the trade, these measures displaced shipments to Southeast Asian states such as Malaysia, Thailand, Vietnam and Indonesia.

This is the "balloon effect" in environmental crime: enforcement in one jurisdiction compresses illicit activity and pushes it into weaker or more profitable jurisdictions. Southeast Asian governments have responded with import bans, raids and container repatriations, but enforcement is complicated by free zones, misdeclaration and corruption risks.

6.3 European Union

The EU combines ambitious collection targets with high treatment costs. This creates both a formal recycling sector and an illicit drain. The Countering WEEE Illegal Trade project estimated that

[22]Grace Akese and Peter C. Little, "Electronic Waste and the Environmental Injustice of 'Toxic Colonialism': A Critical Review of the Agbogbloshie Scrapeconomy" 31 Society & Natural Resources 770 (2018).

[23]Oladele Odeyingbo, Ifeoluwa Nnorom, et.al., Person in the Port Project: Assessing Import of Used Electrical and Electronic Equipment into Nigeria 15-28 (Basel Convention Coordinating Centre for the African Region and United Nations University, Ibadan/Bonn, 2017).

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significant quantities of European WEEE fall outside official collection and treatment channels.[24] Some is stored in households, some is treated informally, and some is exported illegally.

The paradox is that strong regulation can create incentives for evasion where monitoring is incomplete. A recycler who can avoid domestic depollution costs by selling mixed loads to exporters may undercut compliant operators. Therefore, collection targets must be linked to proof of treatment, not merely proof of collection.

6.4 United States

Investigations by the Basel Action Network using GPS trackers found that a substantial portion of tracked electronic devices delivered to recyclers in the United States was exported rather than processed domestically.[25] The precise percentages vary by investigation and device sample, so broad claims should be made cautiously. The central lesson is that voluntary certification and self-reporting are insufficient where downstream verification is weak.

6.5 India

India is both a major generator and a destination for illicit or informal e-waste flows. Its E-Waste Management Rules, 2016 and E-Waste Management Rules, 2022 create an Extended Producer Responsibility framework.[26] The 2022 rules rely substantially on an EPR certificate mechanism. In principle, this can improve accountability. In practice, certificate-based systems require strict auditing; otherwise, paper compliance can occur while physical waste remains in informal channels.

Informal hubs in Delhi, Moradabad and other cities perform labour-intensive dismantling, segregation and recovery. The informal sector is economically efficient in collection but unsafe in processing. A just transition must therefore integrate informal workers into formal systems rather than criminalising them.

VII. ECOLOGIES OF HARM: TOXICOLOGY AND PUBLIC HEALTH

Informal e-waste processing exposes workers and residents to hazardous substances through inhalation, ingestion, dermal contact and food-chain contamination.

Lead exposure occurs through CRT glass, solder and contaminated dust. Children are especially vulnerable because they absorb a higher proportion of ingested lead than adults, and lead interferes with neurological development. There is no safe level of lead exposure for children.[27] Cadmium

[24]Jaco Huisman, Federico Magalini, et.al., Countering WEEE Illegal Trade: Summary Report, Market Assessment, Legal Analysis, Crime Analysis and Recommendations Roadmap 12-25 (CWIT Consortium, Lyon, 2015).

[25]Basel Action Network, "Scam Recycling: e-Dumping on Asia by US Recyclers" 5-12 (2016).

[26]The E-Waste (Management) Rules, 2016, Ministry of Environment, Forest and Climate Change, Notification G.S.R. 338(E), Mar. 23, 2016; The E-Waste (Management) Rules, 2022, Ministry of Environment, Forest and Climate Change, Notification G.S.R. 801(E), Nov. 2, 2022.

[27]World Health Organization, supra note 3 at 18-31.

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exposure is associated with kidney damage, bone disease and carcinogenic risk. Mercury from lamps and switches may transform into methylmercury in aquatic environments and damage neurological development. Brominated flame retardants can disrupt endocrine systems and, when burned, may generate brominated dioxins and furans.[28]

Open burning of PVC-coated wires is particularly dangerous. Low-temperature combustion in the presence of copper can promote formation of chlorinated dioxins and furans. These persistent organic pollutants accumulate in fatty tissues and move through food chains. IPEN and Basel Action Network testing near Agbogbloshie found highly contaminated free-range chicken eggs, with one egg capable of exceeding European tolerable intake levels for dioxins by a very large margin.[29]

Acid leaching of printed circuit boards releases metals into water and sediments. Spent acids are often discharged into drains or rivers, mobilising heavy metals and contaminating aquatic systems. These harms are not isolated occupational risks; they are community-wide environmental injustices affecting children, pregnant women, food systems and future generations.

The World Health Organization has warned that e-waste exposure threatens child health through neurodevelopmental harm, respiratory effects, adverse birth outcomes and chronic toxic exposure.[30] Women and children in informal recycling households often experience exposure even when not formally employed as dismantlers because work is performed in or near living spaces.

VIII. GOVERNANCE FAILURES

8.1 Inspection Deficit

Modern container ports are designed for speed. Customs authorities physically inspect only a small fraction of containers. Imaging systems are better suited to detecting weapons, drugs or contraband than distinguishing functional second-hand goods from mixed e-waste. Environmental officers may not be present at ports, and customs officers may lack training in waste identification.

8.2 Evidentiary Problems

Criminal prosecution requires proof of knowledge or intent. E-waste supply chains are structured through subcontracting, brokerage and documentation layers. A corporate generator may contract with a recycler promising compliant treatment. The recycler may sell to a broker, who sells to an exporter, who consigns the container abroad. When intercepted, each actor may deny knowledge of illegality. The result is diffusion of responsibility.

8.3 Weak Penalties

Where penalties are low, illegal export becomes a cost-benefit calculation. If the expected penalty is lower than the cost saved by avoiding lawful treatment, deterrence fails. Flat fines are inadequate

[28]Id. at 32-42.

[29]International Pollutants Elimination Network and Basel Action Network, "Weak Controls: How European E-Waste Poisons the Food Chain in Ghana" 6-10 (2019).

[30]World Health Organization, supra note 3 at 43-54.

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against large corporations and logistics firms. Sanctions must be proportionate to turnover, profit and harm.

8.4 EPR Design Failure

Extended Producer Responsibility can internalise environmental costs, but poorly designed EPR systems may produce paper compliance. Weight-based targets reward collection volume, not safe treatment. Competitive compliance schemes may select the cheapest contractors. Without digital traceability, independent audits and final-treatment proof, EPR funds may indirectly support leakage.

8.5 Global Inequality

The deepest governance failure is structural inequality. Destination states may depend on second-hand electronics, repair markets and scrap livelihoods. They may lack laboratories, inspectors, clean recycling infrastructure and bargaining power. A purely prohibitionist model risks harming workers unless accompanied by investment, formalisation and remediation.

IX. REFORM AGENDA

9.1 Implement the 2022 Basel Amendments Effectively

States should domesticate the A1181 and Y49 amendments through customs codes, licensing rules, inspection manuals and criminal statutes. PIC should be digitised and linked to customs databases so that shipments lacking valid consent are automatically flagged.

9.2 Mandatory Functionality Testing

Used electronics intended for export should be presumed to be waste unless the exporter proves functionality. Testing must be item-specific, performed by accredited bodies and linked to tamper-resistant digital certificates. A mere power-on test should not be sufficient. Packaging, serial numbers, age, battery condition and repair contracts should be verified.

9.3 Digital Product Passports

Digital product passports can record composition, repair history, ownership transfer, refurbishment and end-of-life destination. If properly designed, they can support right-to-repair policies, customs inspection and producer responsibility. They must, however, be interoperable, privacy-compliant and accessible to regulators in destination states.

9.4 Strict Downstream Corporate Liability

Electronics producers, institutional generators and compliance organisations should bear strict or rebuttable-presumption liability for downstream leakage. If products collected under an EPR scheme are found in illegal export channels or informal dump sites, the responsible producer or PRO should prove lawful treatment or pay remediation costs.

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The EU Corporate Sustainability Due Diligence Directive offers a useful model by linking corporate responsibility to value-chain due diligence and providing for significant penalties.[31] Similar principles should apply to end-of-life electronics.

9.5 Criminal Liability for Brokers and Logistics Intermediaries

Freight forwarders, exporters, brokers and corporate officers who knowingly misdeclare e-waste should face criminal prosecution. Liability should extend to wilful blindness where actors deliberately avoid verifying cargo despite red flags: unrealistic declared values, vague descriptions, high-risk destinations, recently incorporated companies or repeated shipments of "used goods" with no testing records.

9.6 Reform EPR

EPR must shift from collection targets to verified treatment outcomes. Payments should be released only after proof of depollution and material recovery by certified facilities. Fees should be eco-modulated: repairable, modular and non-toxic products should pay lower fees, while products with glued batteries, proprietary parts or hazardous additives should pay more.

9.7 Formalise Informal Workers

Informal workers should not be treated as the principal criminals. They are often the final bearers of harm. Governments should organise workers into cooperatives, provide personal protective equipment, medical screening, training and safe dismantling centres. Mechanical wire strippers, safe storage, ventilation, enclosed processing and non-toxic recovery technologies can reduce harm while preserving livelihoods.

9.8 Remediation Funds

Historical contamination requires polluter-funded remediation. An international e-waste remediation fund, financed by producers, importers and EPR schemes, should support soil remediation, clean water, health surveillance and livelihood transition in affected communities.

9.9 International Environmental Criminal Law

The proposal to recognise ecocide as an international crime remains under debate and is not currently part of the Rome Statute.[32] Nevertheless, the normative direction is important. Large-scale, knowing and systematic dumping of hazardous waste causing severe and long-term environmental harm should attract individual accountability for corporate and public officials.

[31]Directive (EU) 2024/1760 of the European Parliament and of the Council of 13 June 2024 on Corporate Sustainability Due Diligence [2024] OJ L 2024/1760, arts. 27 and 29.

[32]Independent Expert Panel for the Legal Definition of Ecocide, "Commentary and Core Text" 5-11 (Stop Ecocide Foundation, 2021).

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X. CONCLUSION

E-waste trafficking is not a marginal customs problem. It is a structural form of transnational eco-crime produced by the collision of digital hyper-consumption, unequal trade relations, weak waste governance and corporate cost externalisation. The 2022 Swiss-Ghanaian amendments to the Basel Convention are a major step because they bring both hazardous and non-hazardous e-waste within the PIC system among Basel parties. Yet the law will fail if enforcement remains paper-based, if reuse claims remain unchecked, and if penalties remain cheaper than compliance.

A just solution must combine prohibition, accountability and transition. It must prosecute fraudulent exporters and complicit intermediaries, but it must also support legitimate repair economies and protect informal workers. It must make producers responsible for the full life cycle of their products, but it must also require design changes that reduce toxicity and extend product life. Most importantly, it must reject the colonial logic that allows affluent consumers to enjoy digital progress while poorer communities absorb the toxic residue.

Global environmental justice requires that no community be treated as the final dumping ground of the digital economy.