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# The Largest Global Producers of E-Waste And the Need for Change

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# THE LARGEST GLOBAL PRODUCERS OF E-WASTE AND THE NEED FOR CHANGE

## INTRODUCTION

At some point, the device you're using to read this sentence will be thrown away.[1] Your laptop, smartphone, desktop, or tablet will more than likely be discarded.[2] The same is true for your other electronic devices and even for your household appliances.[3] The term "e-waste," short for electronic waste, is used to describe waste generated by these end-of life electronic products.[4] In recent years the global market for electronics has grown exponentially while the lifespan of these products has become increasingly shorter.[5] The explosion of e-waste in recent decades has been exacerbated by a number of contributing factors such as the increased global access to electronic devices, quickening innovation rates, and device obsolescence.[6] The United Nations' Global E-waste Monitor 2020 shows "[a] record 53.6 million metric tonnes (Mt) of electronic waste was generated worldwide in 2019, up 21 percent in just five years."[7] That same report also predicts that global e-waste will climb to 74 Mt by the year

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1. *See generally Technological pollution, a 21st century problem*, IBERDROLA, S.A., https://www.iberdrola.com/environment/what-is-e-waste (last visited Sept. 26, 2022) (explaining that an enormous volume of e-waste is generated per year, using the example of the number of phone's a person may go through in their lifetime to illustrate the quick turnover of our devices).

2. *See id.*

3. *See id.*

4. Rama Mohana R. Turaga et al., *E-Waste Management in India: Issues and Strategies*, 44 VIKALPA: THE J. FOR DECISION MAKERS 127, 127 (2019), https://journals.sagepub.com/doi/full/10.1177/0256090919880655.

5. *See id.*

6. *See* Jan Wisniewski, *Getting (Globally) Accountable for E-Waste*, RESET (Nov. 6, 2018), https://en.reset.org/blog/getting-globally-accountable-e-waste-11062018.

7. *Global E-Waste Surging: Up 21% in 5 Years*, U. N. UNIV. (July 2, 2020), https://unu.edu/media-relations/releases/global-e-waste-surging-up-21-in-5-years.html. The Global E-Waste Monitor is a collaborative product of Global E-waste Statistics Partnership (GESP), formed by the United Nations University (UNU), the International Telecommunication Union (ITU), and the International Solid Waste Association (ISWA), in collaboration with the UN Environment Programme (UNEP). The World Health Organization (WHO) and the German Ministry of Economic Cooperation and Development (BMZ) also substantially contributed to the 2020 Global E-waste Monitor.

2030—nearly doubling in just sixteen years.[8] This projection seats e-waste as the most rapidly growing domestic waste-stream in the world.[9]

Based upon these alarming statistics, it is clear that further international safeguards are necessary to prevent the continued trend of rampant e-waste creation, exportation, and pollution. Specifically, there is a need for stronger legislation, enforcement, and focused accountability to achieve meaningful progress in addressing the global e-waste problem. To tackle the largest global e-waste issues, both the All Actors Approach (AAA) and the implementation of ecocide as an international crime are promising avenues. Part I of this note will discuss some of the most fundamental issues countries face when addressing e-waste management. Part II will analyze economic considerations of e-waste management. Part III and IV of this Note will examine current legislation and regulations governing e-waste in China and the European Union (EU). China and the EU will be this Note's focuses, as they are two of the largest e-waste generators in recent decades. Part V of this Note will examine the AAA as a solution for implementing effective e-waste management. Finally, Part VI advocates in favor of making ecocide an international crime to establish meaningful international accountability and a method of enforcement to facilitate proper e-waste disposal.

## I. THE IMPACT OF E-WASTE ON THE ENVIRONMENT AND THE IMPORTANCE OF E-WASTE MANAGEMENT

The improper disposal of e-waste can cause serious damage to both the environment and to human health.[10] A significant number of electronic products contain toxic components which are harmful when not properly disposed.[11] Many of these products also contain components that do not biodegrade easily, if at all.[12] For example, common items such as television sets and computer monitors are regularly comprised of hazardous materials such as lead and mercury.[13] In addition, nickel, beryllium, and

8. *Id.*
9. *Id.*
10. M. Khurrum S. Bhutta et al., *Electronic Waste: A Growing Concern in Today's Environment*, 2011 ECON. RSCH. INT'L 1, 2 (2011), https://downloads.hindawi.com/archive/2011/474230.pdf.
11. *Id.*
12. *Id.*
13. *Id.* at 3.

zinc are frequently used in circuit boards.[14] Due to the presence of these substances and the dangers they pose to both environmental and human health, the recycling and disposal of e-waste is a distinct issue from the disposal of traditional municipal waste materials.[15]

Most electronic products that eventually become e-waste also contain other harmful substances such as cadmium (Cd), hexavalent chromium (Cr(VI)), polyvinyl chloride (PVC), and brominated flame retardants (BFRs).[16] When these substances are handled with unsophisticated techniques such as incineration, landfill dumping, and acid leaching, they can cause virtually irreparable damage by releasing toxic chemicals into the surrounding atmosphere, soil, and water.[17] These practices can also have significant negative impacts on human health in affected areas.[18] Despite the presence of these hazardous substances in many electronic products, other substances found in e-waste can be recycled, including but not limited to: copper (Cu), iron (Fe), aluminum (Al), plastics, glass, and other precious metals.[19] It is therefore evident that proper e-waste management is critical both for the purposes of protecting the environment from damage due to toxic components and ensuring that precious recyclable materials are collected.[20]

## II. ECONOMIC CONSIDERATIONS COUNTRIES WEIGH WHEN ADDRESSING E-WASTE MANAGEMENT

Further complicating the issue of global e-waste management, the cost of recycling electronic products is usually greater than the revenue generated from recycling these materials—this is particularly true in developed countries with strict

14. *Id.* at 1.

15. *Id.*

16. Jian Cao et al., *Extended producer responsibility system in China improves e-waste recycling: Government policies, enterprise, and public awareness*, 62 RENEWABLE AND SUSTAINABLE ENERGY REV. 883, 883 (2016).

17. *Id.*

18. *Id.* Toxic components found in e-waste have the potential to cause damage to the human brain, heart, liver, and kidney, as well as the skeletal, nervous, and reproductive systems. *See* ELYTUS, *E-Waste & its Negative Effects on the Environment*, https://elytus.com/blog/e-waste-and-its-negative-effects-on-the-environment.html (last visited Nov. 20, 2022).

19. *Id.*

20. *See id.*

environmental regulations.[21] The profitability deficit in e-waste recycling has resulted in the transport of massive amounts of e-waste from developed countries with strict environmental regulations to developing countries that are currently lagging in environmental regulations and enforcement.[22] The practice of shipping e-waste into developing countries is often referred to as "dumping."[23] There are economic motivations driving this practice both for the countries practicing dumping and the countries accepting the e-waste.[24] In developed countries, responsible e-waste treatment is more expensive compared to the cost of transporting it to a country with less regulation.[25] For perspective, removing aluminum from a computer screen costs about eighteen US dollars.[26] Shipping that screen overseas can be as much as ten times less expensive.[27] Furthermore, scenarios such as this commonly provide a cost-related incentive for developed countries to simply dump their e-waste, rather than pay greater expenses for proper disposal or recycling.[28]

In a capitalist system such as the United States (US), good recycling behavior is often not rewarded and offers no competitive advantage.[29] Developed countries attempt to maximize economic, environmental, and social benefits at home when addressing e-waste management.[30] Despite the cost-deficit associated with proper recycling techniques in comparison with dumping, e-waste recycling does have important economic value.[31]

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21. Bhutta et al., *supra* note 10, at 2.

22. *Id.*

23. *See* Adam Minter, *The Burning Truth Behind an E-Waste Dump in Africa*, SMITHSONIAN MAG. (Jan. 13, 2016), https://www.smithsonianmag.com/science-nature/burning-truth-behind-e-waste-dump-africa-180957597/.

24. *See* Florence Rodhain, *Electronic Waste Dumped in the Global South: Ethical Issues in Practices and Research*, THE PATHS OF ETHICS IN RSCH. IN LAOS AND MEKONG COUNTRIES 95, 97 (2019), https://hal.archives-ouvertes.fr/hal-01967074/document.

25. *Id.*

26. *Id.*

27. *Id.*

28. *See id.*

29. *Id.*

30. Yang et al., *Towards Holistic Governance of China's E-Waste Recycling: Evolution of Networked Policies,* INT'L. J. OF ENV'T RSCH. AND PUB. HEALTH 2, 21 (2020).

31. *See* Brook Lamar, *E-Waste Offers an Economic Opportunity as Well as Toxicity,* N.Y. TIMES (July 5, 2018), https://www.nytimes.com/2018/07/05/magazine/e-waste-offers-an-economic-opportunity-as-well-as-toxicity.html.

The raw materials contained in e-waste in 2016 alone were worth roughly sixty-one billion US dollars, greater than the gross domestic product of some middle-income countries.[32] Countries could secure a significant amount of valuable raw materials by recycling the mountains of e-waste being generated each year, rather than relying on mining from the earth alone to obtain these resources.[33] This value may help relieve some of the tension between industrial development and resource shortages in developing countries, while preserving the earth's limited natural resources and the habitability of our environment.[34]

## III. CHINA ON DOMESTIC E-WASTE MANAGEMENT AND LEGISLATION

In 1990, China signed the *Basel Convention*, an international treaty aimed at regulating the movements of hazardous waste between nations.[35] This only somewhat marked the beginning of e-waste management in China.[36] Like many countries, China enacted compulsory laws and regulations on e-waste recycling.[37]Although the Chinese government issued related laws, there was negligible change from 1990 to 2009.[38] Prior to May 2009, e-waste in China was largely collected and disposed of by street peddlers and family-run workshops.[39] Unrepairable products were brought to informal waste-treatment centers, most notably to Guiyu in the Guangdong Province.[40] Beginning in 2009, the Chinese government issued a series of regulations and legislation which established an e-waste management system based on Extended Producer Responsibility (EPR) principles, with the goal of improving environmental protection and resource

32. *Id.*
33. *See id.*
34. *See id.*
35. *International Agreements on Transboundary Shipments of Hazardous Waste*, EPA https://www.epa.gov/hwgenerators/international-agreements-transboundary-shipments-hazardous-waste.; *See also* Cao et al., *supra* note 16, at 883.
36. *See generally* Cao et al., *supra* note 16, at 884.
37. *Id.*
38. *Id.*
39. *Id.*
40. *Id.* "Guiyu was once the largest e-waste recycling center in China and was infamous for primitive e-wastes treatment. Before 2012, there were 5169 e-waste treatment workshops and more than 60,000 practitioners in Guiyu. More than 1 million tonnes of e-wastes were dismantled annually…" *Id.* at 889.

usage.[41] EPR laws require manufacturers to take responsibility for their products through the end of their lifecycles.[42] This includes responsibility for product collection, the dismantling process, and reuse.[43] An effective EPR law improves recycling outcomes and provides incentives for innovation to create less resource-intensive products.[44]

China's "Old for New" policy, which began in June 2009, promoted the creation of a more standardized and large-scale e-waste recycling industry in China.[45] The policy provided subsidies for consumers selling their old electronic products when buying new products, which in turn promoted e-waste recycling and the rise of e-waste collection enterprises.[46] E-waste collection enterprises refer to the professional collection of e-waste, dismantling devices, standard disposal processes, and national standards for residue emissions in accordance with the government.[47] E-waste collection enterprises could obtain subsidies for the transportation of e-waste per unit, based on product type and transport distance, further prompting the formal collection system.[48] The formal collection and recycling system in China stood in steep contrast to informal and illegal recycling practices, which typically utilized hazardous and environmentally damaging techniques to dispose of e-waste.[49] The policy was first implemented in nine pilot regions and expanded nationwide in June 2010.[50] The policy proved difficult to maintain, and by 2012

41. *Id.* at 883; *see also Extended producer responsibility*, OECD, https://www.oecd.org/env/tools-evaluation/extendedproducerresponsibility.htm (last visited Dec. 6, 2022) ("Extended Producer Responsibility is a policy approach under which producers are assigned significant responsibility for the treatment or disposal of post-consumer products, both financially and physically. Assignment of this responsibility comes with the goal of incentivizing the prevention of wastes at the source, which promotes product designs geared towards the environment and the achievement of recycling and materials management goals.")

42. Cao et al., *supra* note 15, at 883.

43. *Id.*

44. Meg Hassey et al., *Who Pays the Bill for Plastic Waste?,* NEW SEC. BEAT (Jan. 7, 2021), https://www.newsecuritybeat.org/2021/01/pays-bill-plastic-waste/.

45. Cao et al., *supra* note 16, at 883.

46. *Id.* at 884.

47. *Id.* at 883.

48. *Id.* at 884.

49. *Id.* at 883.

50. *Id.* at 884.

e-waste recycling in China fell sharply again.[51] From 2010 to 2012, Chinese officials rolled out a series of regulations and statutory proclamations in anticipation of implementing EPR-based recycling of e-waste.[52]

On July 1, 2012, the *Administrative Measure on Tax Levy and Use for E-waste Recycling* (the Measure) was promulgated, marking the beginning of EPR implementation in China, with additional statutes and circulars being added continuously.[53] The Measure contained "general rules, tax administration, subsidy utilization, oversight, legal liability, and supplemental rules."[54] As a result of the EPR system taking effect in China, the amount of recycled e-waste by formal channels increased.[55] Large end-of-life electronic products such as televisions, refrigerators, washing machines, air conditioners, and desktop computers were almost all collected in China because people could sell their e-waste to private traders or to recycling enterprises for profit.[56] The Measure applies to all producers of electrical and electronic equipment (EEE), taxed by the State Administration of Taxation of China, and also applies to EEE importers, taxed by consumers.[57] The taxes are used as subsidies for e-waste recycling and for the creation of management information systems.[58] These subsidies promote formal recycling enterprises to buy e-waste from private traders—previously most e-waste was handled by informal disposal channels.[59] According to the China Resource Recycling Association, statistics showed that the resources saved by e-waste recycling in 2013 was "143 thousand tonnes of standard coal plus 23.9 million cubic meters of water."[60] The treatment techniques utilized by large enterprises tended to improve in such a way that greatly increased the value of e-waste recycling.[61]

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51. *Id.*
52. *Id.*
53. *Id.* at 883.
54. *Id.* at 884.
55. *Id.* at 883.
56. *Id.*
57. *Id.*
58. *Id.*
59. *Id.*
60. *Id.* at 885.
61. *Id.*

China's Solid Waste Law was originally adopted on October 30, 1995.[62] The law "covers the prevention and control of pollution from industrial waste, household waste, construction waste, agricultural waste, and hazardous waste."[63] On April 29, 2020, an amendment by the National People's Congress was approved and the revisions include a section on EPR.[64] The revised Solid Waste Law updates the legal framework for the prevention and control of pollution stemming from solid waste and consolidates recent Chinese policies on, among other things, solid waste imports and EPR.[65] Specifically, the amendment requires the government to establish an EPR system for electrical and electronic products, lead storage batteries, and automotive power batteries.[66] In addition, producers of products covered by the amendment are required to establish a recycling system for used products that matches the sales volume of the products and are responsible for public awareness of the recycling systems they establish.[67] The new revisions further the Chinese government's efforts to come closer to "zero" solid waste imports by strengthening supervision and management.[68]

The revisions to China's Solid Waste Law integrate solid waste management into already existing environmental programs.[69] Waste generators are required under the revisions to create a responsibility system for managing pollution throughout the generation, collection, storage, transport, use, and disposal of solid waste.[70] The revisions create an obligation for waste

62. *Revision to China's Solid Waste Law*, SPHERAEC4P (June 8, 2020), https://ec4p.com/resources/news/revision-to-china-solid-waste-law.

63. *Id.*

64. *Id.*; (China's National People's Congress is the national legislature. Delegates to the NPC are elected by the provinces, these are autonomous regions and municipalities directly under the central government. There are around 3,000 members of the NPC, however, only around 150 members of the NPC's Standing Committee are actively engaged in law making and amending laws.) Tony Saich, *The National People's Congress: Functions and Membership,* HARV. KENNEDY SCH. (Nov. 2015). https://ash.harvard.edu/files/ash/files/the_national_peoples_congress.pdf.

65. Aaron Goldberg & Weiwei Luo, *China Promulgates Amendment to Its Solid Waste Law*, JDSUPRA (May 12, 2020), https://www.jdsupra.com/legalnews/china-promulgates-amendment-to-its-63183/.

66. *See id.*

67. *Id.*

68. *Id.*

69. *See id.*

70. *Id.*

generators to verify "the qualifications and technical capacity of their waste vendor(s) . . . to transport, use, or dispose of wastes in accordance with environmental control measures specified in the contracts."[71] Under the revisions, should a waste generator fail to verify the qualifications of the vendor, or if no written contract is established with said vendor, the generator will be subject to administrative penalties and shall be jointly liable with the vendor for any pollution resulting from their operations.[72] Thus, the revisions established extended responsibility for the waste generator not only with regard to environmental damages created during the waste generation process, but they also create joint liability with the vendor for any damages caused by the waste vendor in its waste management process.[73]

While it is true that the newly broadened potential liability for waste generators is only triggered if the waste generator fails to verify the capacity of the vendor or fails to obtain the required written contract, risks to the generator are still amplified because there currently is no clear guidance or criteria to determine the proper verification of a vendor's technical capabilities.[74] China has also made efforts to develop a system where controls for different types of pollutant and emission categories, such as air and water pollutants, can be integrated into a singular permit system.[75] The permit system specifies compliance obligations for enterprises with operations in China.[76] The new revisions incorporate solid waste into the pollutant emission permit system and holds accountable solid waste generators that operate without a permit.[77] Solid waste, including e-waste, has become the third type of pollutant to be covered by the emission permit system in China.[78]

The revisions to China's Solid Waste Law under the April 29, 2020, amendment incorporated an array of key enforcement measures.[79] The revisions significantly increase monetary penalties and sanctions for the improper management of solid

71. *Id.*
72. *Id.*
73. *Id.*
74. *Id.*
75. *Id.*
76. *Id.*
77. *Id.*
78. *Id.*
79. *See e.g., id.*

waste.[80] The revisions also introduce other penalty measures, including the sealing or seizure of facilities, equipment, tools, and other articles involved in unlawful solid waste management practices that cause or threaten to cause environmental damage.[81] In order to bolster enforcement of the laws, the revisions additionally establish a whistle blower policy, wherein whistleblowers are rewarded and shielded from retaliation by their employers.[82] Prior to the aforementioned revisions to the Solid Waste Law, there was no clause for "detaining persons assuming personal liability regarding environmental pollution caused by solid waste."[83] The revisions add legal representatives and persons chiefly in charge to the personal liability scope.[84]

The new Solid Waste Law provides that where an entity, in violation of the provisions of the law, commits any of the following acts, which do not reach the severity to constitute a crime, the public security authority shall detain the legal representative, the person chiefly in charge, the person directly in charge, and any other liable persons for a period of up to fifteen days; and if the circumstances are relatively minor, a detention of between five and ten days.[85] The punishable acts include: (1) dumping, piling up, discarding or disposing solid wastes without authorization and thus causing critical consequences; (2) constructing facilities or sites for centralized storage, utilization, or treatment of industrial solid wastes or hazardous wastes or landfills for domestic wastes in red line areas for ecological conservation, areas where permanent basic farmlands are concentrated, or other areas which need special protection; (3) supplying or entrusting hazardous wastes to an entity that does not have a license or any other producer or business operator for piling up, utilization or disposal; (4) engaging in the collection,

80. *Id.*

81. *Id.*

82. *Id.* "The revisions shield whistleblowers from retaliation by their employers in the form of termination or employment or changes to labor contracts." *Id.*

83. Sarah Wang, *Overview on the Newly Amended Law of the People's Republic of China on Prevention and Control of Environmental Pollution Caused by Solid Waste*, CMS LEGAL, https://cms.law/en/chn/publication/overview-on-the-newly-amended-law-of-the-people-s-republic-of-china-onprevention-and-control-of-environmental-pollution-caused-by-solid-waste (last visited Sept. 27, 2022).

84. *Id.*

85. *Id.*

storage, utilization and treatment of hazardous wastes without a permit or in violation of the provisions of the permit; (5) transferring the hazardous wastes without approval; and (6) failing to take precautionary measures and causing the scattering, loss, leakage or other serious consequences of hazardous wastes.[86]

Strengthening the legislation and enforcement measures of environmental protections has become a top priority of the Chinese government in recent years.[87] It is speculated that with these recent revisions, solid waste related industries will come under stricter scrutiny, monitoring, and inspections as part of their daily business.[88] These stricter management measures demonstrate China's recognition of the need for greater accountability, assignment of liability, and enforcement when it comes to e-waste management legislation.

### *A. China on international e-waste management and legislation: the global effects of the 2018 Chinese ban on solid waste imports.*

Prior to a sweeping waste-import ban enacted in January 2018, China was categorically the world's largest waste importer.[89] China imported 56 percent of the world's plastic waste (7.35 million tons in 2016 alone) and over 70 percent of the world's e-waste (350 million tons per year), this enormous figure emerged despite a previous e-waste import ban enacted in 2000, among other regulations.[90] Although China had already underwent two decades of laws and regulations limiting unusable waste imports, the 2018 ban was by far the most robust.[91] After the ban was announced but prior to coming into effect, "Chinese authorities investigated 286 criminal cases involving 866,800 tons of illegally-imported waste and imposed sanctions on more than eight hundred companies."[92] Many countries were ill-prepared to deal with the effects of the ban.[93] High-income countries

86. *Id.*
87. *Id.*
88. *Id.*
89. *China's Waste Ban Exposes Missing Links in Recycling*, VT. J. OF ENV'T L., https://vjel.vermontlaw.edu/topten/chinas-waste-ban-exposes-missing-links-recycling (last visited Sept. 27, 2022).
90. *Id.*
91. *See id.*
92. *Id.*
93. *Id.*

resorted to short-term solutions when China began its crackdown on illegal waste imports.[94] For example, Europe, Japan, and Australia incinerated more waste, while the United States and Canada shipped more materials to landfills.[95]

Following the enactment of China's 2018 major ban on waste imports, many traders transitioned their predatory waste transport to "South and Southeast Asian . . . countries such as Thailand, Indonesia, Pakistan, India, and Malaysia."[96] This information was obtained by the Basel Action Network (BAN), an non-governmental organization combatting global waste dumping.[97] For years, BAN "tracked the waste exports to China, used GPS trackers to monitor the most recent flows of waste across the globe."[98] Unfortunately, the results revealed that once a country-wide ban is enacted, the waste industry is able to simply relocate to different countries, particularly those not yet in a position to turn away the import of e-waste due to economic imbalances.[99] Country-level import bans are therefore not likely to solve the global e-waste problem, nor prevent the continuation of dumping practices.[100]

## IV. THE EUROPEAN UNION ON DOMESTIC E-WASTE MANAGEMENT AND LEGISLATION.

In Europe, the majority of e-waste management is covered by the Waste Electrical and Electronic Equipment Directive 2012/19/EU (WEEE Directive), which originally took effect in February 2003 and has been continuously amended.[101] The

94. *Id.*

95. *Id.*

96. *Thailand passes strict ban on the importation of electronic waste*, RECYCLING MAG. (July 10, 2020), https://www.recycling-magazine.com/2020/10/07/thailand-passes-strict-ban-on-the-importation-of-electronic-waste/.

97. *Id.*

98. *Id.*

99. *See id.*

100. *See* Aarushi Jain, *Trash Trade Wars: Southeast Asia's Problem with the World's Waste*, CFR (May 8, 2020, 2:42 PM), https://www.cfr.org/in-brief/trash-trade-wars-southeast-asias-problem-worlds-waste.

101. VANESSA FORTI ET AL., THE GLOBAL E-WASTE MONITOR 2020, 8, 76 (2020), https://www.itu.int/en/ITU-D/Environment/Documents/Toolbox/GEM_2020_def.pdf; *see also WEE Compliance*, ROHS GUIDE, https://www.rohsguide.com/rohs-weee.htm (last visited Sept. 27, 2022) (stating that the WEEE Directive is the European Community Directive 2012/19/EU on waste electrical and electronic equipment which,

directive is adhered to by the EU and Norway.[102] Other European countries also have similar laws, including Iceland, Switzerland, Serbia, Bosnia, and Herzegovina.[103] The objectives of the WEEE Directive are (1) to contribute to the efficient use of resources, (2) to reduce the amount of e-waste entering landfills, and (3) to encourage the reuse and recycling of electrical and electronic equipment.[104] The WEEE Directive took effect on February 14, 2014.[105] Since August 15, 2018, all electrical and electronic equipment is addressed under the directive, unless specifically enumerated as an exclusion.[106]

The implementation of the WEEE Directive varies across EU member states, for reasons related to differing procedures and costs.[107] Under the WEEE Directive, producers of electrical and electronic products must register as a producer with the competent member state authority, submit data on their electronic and electrical equipment (EEE) in the EU Market, and submit data on what has been recycled by them or by a competent body (such as the collective systems established in member states).[108] Producers must also ensure that products are correctly labeled and designed to allow for correct disposal by end-users.[109] Producers are additionally responsible to establish collection systems, both individual schemes and collective ones are available to accomplish this.[110]

The WEEE Directive set collection, recycling, reuse, and recovery targets for all six categories of e-waste.[111] The six categories include (1) temperature exchange equipment, (2) screens and monitors, (3) lamps, (4) large equipment (such as washing machines, stoves, printers, etc.), (5) small equipment (such as toasters, cameras, electronic toys, etc.), and (6) small information

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together with the RoHS Directive 2011/65/EU, set collection, recycling and recovery targets for all types of electrical goods).

102. *Id.*

103. *Id.*

104. *Id.*

105. *European Union: Waste Electrical and Electronic Equipment (WEEE 2)*, U.S. COM. SERV. (Mar. 2019), https://2016.export.gov/europeanunion/build/groups/public/@eg_eu/documents/webcontent/eg_eu_127663.pdf.

106. *Id.*

107. *Id.*

108. *Id.*

109. *Id.*

110. *Id.*

111. *Id.*

technology and telecommunication equipment.[112] According to the WEEE Directive, "the minimum collection rate to be achieved annually by a member state shall be either 65% of the average waste of EEE [place of market] in the three proceeding years or 85% of e-waste generated on the territory of a member state in 2018."[113] There are several members with the option to remove themselves from this regulation by 2021, due to their relatively low level of EEE consumption, including Bulgaria, the Czech Republic, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia, and Slovakia.[114]

The most recent updates in the implementation of the WEEE Directive are the addition of "the open scope," along with newly specified reporting guidelines.[115] The open scope indicates that EEE products are all considered to be within the scope of the WEEE Directive in the European Union, unless specific exclusions state otherwise.[116] This means that new products, such as clothes and furniture with electronic components, would be covered under the WEEE Directive.[117] Under the WEEE Directive, when e-waste is transported for treatment in another member state, or if it is exported for treatment to a third country, the member state that initially collected and transported the e-waste for treatment is the only one that may count it towards the aforementioned recovery targets.[118] This contributes to data accuracy in showing how much e-waste is generated versus how much is recovered.[119] As for the updated reporting guidelines, member states must report the data collected regarding the weight of e-waste generated.[120]

The European Union has an established e-waste management infrastructure to collect e-waste in shops and municipalities by private operators, to recover recyclable components of the collected e-waste, and to dispose of residuals in an environmentally conscious manner.[121] Indeed, there is a long-running history of

112. *Id.*
113. FORTI ET AL., *supra* note 101.
114. *Id.*
115. *Id.*
116. *Id.*
117. *Id.*
118. *Id.*
119. *Id.*
120. *Id.*
121. *Id.* at 77.

e-waste legislation in the EU, beginning as early as 2003.[122] The term "Extended Producer Responsibility" was introduced by Thomas Lindhqvist of Sweden in 1990.[123] The term is largely understood to reflect a "shift in responsibility . . . from governments or municipalities to producers . . ."[124] The concept also refers to the encouragement of producers to take into account environmental considerations when designing and manufacturing products.[125] The goal of EPR is to reduce the environmental impact of products from production through end-of-life.[126]

In the European Union, EPR is a requirement with respect to EEE disposal.[127] In accordance with EPR principles, the WEEE Directive makes producers, manufacturers, distributors, importers, and distance sellers responsible for the organization and/or financing of the collection, treatment, recycling, and recovery of their products.[128] Producers have the option to participate in a fee-based organization, known as a "compliance scheme," that handles collection, treatment, and recycling for them.[129] Alternatively, they may choose to self-handle said tasks and submit their own waste management plans to national or regional authorities accordingly.[130] Most commonly, producers opt to join a collective scheme, simplifying this process.[131] Manufacturers are also required to "create dismantling guides and recommendations for easy dismantling, de-pollution, and recovery," as well as provide take-back operations.[132] Take-back operators and vendors are audited on a regular basis under the WEEE Directive.[133]

Enforcement on non-compliance with the registration, reporting, recovery, and recycling provisions of the WEEE Directive

122. *Id.*
123. *Development of guidance on Extended Producer Responsibility (EPR)*, EUR. COMM'N (FEB. 8, 2019), https://ec.europa.eu/environment/archives/waste/eu_guidance/introduction.html.
124. *Id.*
125. *Id.*
126. *Id.*
127. *Id.*
128. U.S. COM. SERV., *supra* note 105.
129. *Id.*
130. *Id.*
131. *Id.*
132. ROHS GUIDE, *supra* note 101.
133. *Id.*

was handled by the Environment Agency through 2015.[134] There have been very few enforcement actions recorded on the agency's public register.[135] Since 2015, the enforcement of these provisions has been handled by the National Measurement and Regulation Office.[136] For noncompliance, WEEE regulations stipulate fines of up to £5,000 in a magistrates' court and unlimited fines in a Crown Court.[137] Due to administrative burden, inspections, followed by warning letters, are typically used as the most common enforcement methods.[138]

The WEEE Directive has a large margin of discretion for member states with regard to the regulation of their own e-waste management systems—this tends to impede the achievement of the overall objectives for the Directive.[139] EPR policies were meant to incentivize changes in producers' behavior, which would increase innovation and create more sustainable products.[140] In practice, e-waste is actually managed by multiple stakeholders, including, but not limited to, producers, municipalities, repairers, and other operators, which do not always have clear assignments of responsibility.[141] Another significant source of ambiguity under the Directive is the six aforementioned WEEE categories of e-waste.[142] The six categories are defined too broadly to properly reflect the complexities of e-waste management, leading member states to introduce their own subcategories for reporting.[143] As a result, these subcategories vary among member states, which, in turn, reduces the overall effectiveness of reporting.[144] Producers frequently must report to various authorities across different countries—some examples are customs, public relations officers, and environmental

134. *Non-compliance with the WEEE Directive: what's the worst that can happen?*, EDIE (Apr. 7, 2016), https://www.edie.net/blog/Non-compliance-with-the-WEEE-Directive-whats-the-worst-that-can-happen/6098068.

135. *Id.*

136. *Id.*

137. *Id.*

138. *Id.*

139. Stefan Sipka, *Towards circular e-waste management: How can digitalization help?*, EUR. POL'Y CTR. 3, 14 (Sept. 30, 2021), https://weee-forum.org/wp-content/uploads/2021/09/Towards-circular-ewaste-management_how-can-digitalisation-help_EPC.pdf.

140. *Id.*

141. *Id.*

142. *See id.*

143. *See id.*

144. *Id.*

agencies.[145] The lack of uniformity in these areas across EU member states complicates reporting and makes data gathering for e-waste more prone to errors.[146] Moreover, the WEEE Directive does not establish a clear link between e-waste management and the use of the gathered data, it simply creates rules for producers to provide such information to waste operators.[147]

Another key piece of legislation governing electrical and electronic products in the EU is the Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive (the RoHS Directive).[148] As previously discussed, many electronic products can release harmful and hazardous substances during their life cycle, which can lead to major environmental harms and human health problems.[149] To specifically address these dangers, The RoHS Directive restricts the use of ten substances: "lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE), bis(2-ethylhexyl) phthalate (DEHP), butyl benzyl phthalate (BBP), dibutyl phthalate (DBP) and diisobutyl phthalate (DIBP)."[150] These restricted substances are classified as hazardous and can be substituted with safer alternatives.[151] In addition to preventing the risks posed to human health and to the environment related to the management of e-waste, the RoHS Directive promotes the recyclability of electric and electronic products by reducing the amount of hazardous substances contained in end-of-life products when the time comes to recycle them.[152] This is significant because if EEE products are not created using these hazardous substances, they become less of a health risk to handle and to properly recycle.[153] Every product with an electrical or electronic component must comply with these restrictions, unless specifically excluded.[154]

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145. *Id.*
146. *See id.*
147. *Id.*
148. *Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS)*, EUR. COMM'N, https://ec.europa.eu/environment/topics/waste-and-recycling/rohs-directive_en (last visited Sept. 27, 2022).
149. *Id.*
150. *Id.*
151. *See id.*
152. *Id.*
153. *Id.*
154. *Id.*

In order to ensure compliance with the RoHS Directive, several obligations have been placed onto manufacturers of electrical and electronic products.[155] Manufacturers must "[e]nsure that all EEE products placed on the EU market have been designed and manufactured in accordance with the requirements of RoHS II."[156] Manufacturers must create "required technical documentation and carry out the internal production control procedure or have it carried out [for them]."[157] The technical documentation "provides information on the design, manufacture, and operation of a product and must contain all of the details necessary to demonstrate the product conforms to the applicable requirements."[158] The documentation must be disclosed to the market surveillance authorities upon request once the product is on the market.[159] The requirement that manufacturers provide technical information on their products safeguards against products being made with prohibited hazardous substances and components through oversight.[160] Manufacturers must also draw up an EU Declaration of Conformity and keep it, along with technical documentation, for ten years after the product has been placed onto the EU market.[161] The EU Declaration of conformity is a mandatory document which declares that a manufacturer's product(s) comply with all EU requirements.[162] By signing a declaration of conformity, the manufacturer assumes total responsibility for its products in compliance with EU law.[163]

The RoHS is enforced by "national enforcement bodies," the National Measurements Office (NMO) is one such entity.[164] The penalties for non-compliance with the RoHS can vary

155. *See EU ROHS 2 – Chemicals restrictions in Electrical and Electronic Equipment*, U.S. COM. SERV. (March 2019), https://2016.export.gov/europeanunion/build/groups/public/@eg_eu/documents/webcontent/eg_eu_127667.pdf.

156. *Id.*

157. *Id.*

158. *Technical documentation and EU declaration of conformity*, YOUR EUR., https://europa.eu/youreurope/business/product-requirements/compliance/technical-documentation-conformity/index_en.htm (last visited Sept. 27, 2022).

159. *Id.*

160. *See id.*

161. *Id.*

162. *Id.*

163. *Id.*

164. ROHS GUIDE, *supra* note 101.

significantly among different EU countries, however they can range from fines to even imprisonment in some member states.[165] In drawing up a declaration of conformity, a manufacturer assumes the responsibility for compliance of their product with the Directive.[166]

### *A. The European Union on international e-waste management and legislation*

In order to combat the exportation of e-waste to less developed countries, which are generally less able to recycle it properly and safely, the EU signed the 1989 Basel Convention.[167] This treaty was created with the goal of reducing the international transport of hazardous WEEE, especially to less-developed countries.[168] As of 2021, the EU recycles "about 80 percent of the e-waste it collects."[169] Although the collection and recovery of e-waste in the EU has undeniably improved over time, the average collection rate for e-waste in the EU is still "less than half the weight of electronic products placed onto the market . . ."[170] This leaves a question of what happens to the mass of tonnage left unaccounted-for. Some of it can be traced back to the "mismanagement of e-waste, illegal shipments, and other criminal activities."[171] The illegal shipment of toxic electronics to developing countries remains one of the main challenges for EU member states when collecting and recovering e-waste.[172]

In the years following the Chinese ban on imports of solid waste, Romania has reportedly become the new "dumping ground for illegally imported trash [exported] from mostly European countries."[173] The smuggling of illegal waste into Romania

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165. *Id.*

166. *Id.*

167. Alice Tidey, *EU e-waste 'illegally' exported to developing countries: Report*, EURONEWS (July 2, 2019), https://www.euronews.com/2019/02/07/eu-e-waste-illegally-exported-to-developing-countries-report.

168. *Id.*

169. Elena S. Nicolás, *Criminal dumping poses test for EU's electronic waste*, EUOBSERVER (May 21, 2021, 7:03 PM), https://euobserver.com/climate/151879.

170. *Id.*

171. *Id.*

172. *See id.*

173. Marian Pavalasc, *How Romania Turned into An Illegal Dumping Ground for EU Waste*, RADIO FREE EUR./RADIO LIBERTY (Aug. 29, 2021, 1:05 PM), https://www.rferl.org/a/romania-garbage-asia-european-union/31429822.html.

is largely based on a rule which allows the passing of raw materials from one EU member state to another.[174] Smugglers circumvent current e-waste transport laws by declaring shipments as raw material for recycling, or as second-hand products to be sold, while they actually contain illegal waste products.[175] In countries such as "Germany, Belgium, and Greece, hazardous waste can cost up to [one thousand] euros per ton to dispose of."[176] Companies attempt to cut costs by instead shipping their waste to Romania, at only about 250 euros per ton comparably.[177] Once in Romania, the waste can simply be dumped into landfills or burned rather than undergo costly handling in accordance with EU regulations.[178] The head of Romania's environmental protection agency stated that "around 3,700 tons of waste has been smuggled into Romania in 2021 alone."[179] Illegal imports of waste to Romania have been recorded as originating even from countries far outside of the EU, including Japan, China, and Saudi Arabia.[180] The uptick of e-waste entering Romania has dramatically increased in recent years, as countries look for an alternative place to dump waste since China, and several other Asian countries, have enacted hard bans on accepting the waste.[181]

## V. EXTENDED PRODUCER RESPONSIBILITY AND THE ALL ACTORS APPROACH TO E-WASTE MANAGEMENT.

The responsible collection, disposal, and recycling of e-waste is not sufficiently realized by simply extending responsibility to producers alone.[182] Despite the various measures and legislation discussed above, including the implementation of EPR by China and the EU, e-waste is still the fastest growing municipal waste-stream globally.[183] The ongoing discussion surrounding the improvement of the existing EPR policy frameworks range from

174. *Id.*
175. *Id.*
176. *Id.*
177. *Id.*
178. *Id.*
179. *Id.*
180. *Id.* at 3.
181. *Id.*
182. *See* WEEE F., AN ENHANCED DEFINITION OF EPR AND THE ROLE OF ALL ACTORS 4, 20 (2020), https://weee-forum.org/wp-content/uploads/2020/11/EPR-and-the-role-of-all-actors_final.pdf.
183. U.N. UNIV., supra note 7.

better enforcing EPR principles to formally assigning responsibility to stakeholders involved in e-waste management.[184] Although extended producer responsibility can play an important role in creating accountability for the safe disposal and recycling of e-waste, it clearly is not sufficient on its own to realize an effective e-waste management strategy.[185]

The AAA is a policy model in which all participants, both private entities and public authorities, which are involved in the collection, logistics, preparation for reuse, refurbishment, treatment, or recycling of WEEE, or in the monitoring, legislative or enforcement activities, are subject to minimum legal obligations.[186] These obligations include "compliance with legislation, reporting to the competent authorities, and meeting official standards and communication."[187] Under this approach, all actors must collaborate in good faith and work to achieve the common goal of responsible WEEE operations.[188] Put simply, AAA creates legal obligations for all actors involved in the WEEE management process and must contribute in-line with their requirements.[189] This approach facilitates increased inclusivity and fairness in the market and enhances collaborative monitoring.[190]

This model is based not only on enforcement, but also on cooperation.[191] In the AAA, a range of actions from multiple stakeholders is required, this necessitates the creation of a coordination body.[192] A coordination body is typically described as a not-for-profit entity, which may be public, private, or hybrid, with authorities to govern joint efforts aimed at increasing collection.[193] An ideal coordination body should be "composed of and governed by representatives of national competent authorities, PROs, producers, retailers, local authorities, social economy enterprises, recyclers . . . brokers, dealers and traders . . . end

184. WEEE F., supra note 182.
185. *Id.*
186. *Id.* at 13.
187. *Id.*
188. *Id.*
189. *See id.*
190. *Id.*
191. *Id.*
192. *Id.*
193. *Id.*

users, and other[s] . . . (such as installers and demolition companies)."[194]

The coordination body should manage the "data collection, monitoring of WEEE flows reporting by all actors, allocation of WEEE collection and the financing responsibility among various PROs."[195] The coordination body would also "engag[e] with stakeholders in the collection network, leading joint communication campaigns, [serve as] the point of contact for contributing to enforcement planning and coordinate any other means . . . for increasing collection."[196] An effective coordination body also would centralize all joint activities for increased collection at a national level, providing enhanced control of e-waste collection and management.[197] Finally, the coordination body would also facilitate communication between all actors involved in AAA, as well as third parties.[198]

The use of AAA as an effective policy approach for raising collections rates of e-waste at a national level is already supported by early data.[199] A survey among PROs in the WEEE forum showed that, of thirteen countries that were analyzed in detail, eight countries had started to implement the AAA: Belgium, Switzerland, Cyprus, Greece, Ireland, Italy, the Netherlands, and Spain.[200] Although those countries have only recently implemented AAA, the survey revealed that there was a collection rate of 45 percent in those eight countries, compared to the 39 percent average for other countries surveyed.[201] There is undeniably limited data on the effectiveness of the AAA. Notably, however, the effective implementation of AAA in the Netherlands did indicate that "an additional 2.2 kg/inhabitant of WEEE collected and treated/recycled by responsible, CENELEC certified recyclers that was previously unreported could be attributed to the All Actors Approach."[202]

194. *Id.* at 20.
195. *Id.*
196. *Id.*
197. *Id.*
198. *Id.*
199. *Id.* at 14.
200. *Id.*
201. *Id.*
202. *Id.*

## VI. ECOCIDE AS A SOLUTION FOR ACCOUNTABILITY AND ENFORCEMENT OBSTACLES ASSOCIATED WITH GLOBAL E-WASTE MANAGEMENT.

Weak law enforcement is a continuous problem countries confront when implementing environmental protections and e-waste management plans.[203] As earlier discussed, proper e-waste management avenues are often not economically advantageous for developed countries.[204] The impact of the explosion in global e-waste generation weighs disproportionately heavily on developing countries importing the waste of high-income countries.[205] The assignment of clearly defined responsibility for proper e-waste disposal and recycling, coupled with meaningful enforcement, would improve global e-waste handling.[206] The global recycling system requires more targeted action and strengthened enforcement efforts among nation states and private sectors, beyond each nation state's unilateral efforts, in order to achieve meaningful progress in solving the e-waste crisis.[207]

One glaring takeaway from the aftermath of China's 2018 solid-waste import ban is that legislation with teeth can create the most substantive change.[208] The criminalization of violators of the new policy essentially froze the import of e-waste in China, especially when viewed in comparison with China's previous status as the world's dumping ground.[209] The criminalization of environmental destruction at an international level may be a similarly effective method for curtailing the global e-waste crisis.[210] International law currently recognizes four primary international crimes.[211] These crimes include genocide, war crimes, crimes against humanity, and the crime of aggression.[212] These crimes are outlined by the Rome Statute of the International

203. *See generally* Sipka, *supra* note 139.
204. *See* Rodhain, *supra* note 24.
205. *See id.*
206. *China's Waste Ban Exposes Missing Links in Recycling*, *supra* note 89.
207. *Id.*
208. *See generally id.*
209. *See id.*
210. *See* Josie Fischels, *How 165 Words Could Make Mass Environmental Destruction An International Crime*, NPR (June 27, 2021, 8:00 AM), https://www.npr.org/2021/06/27/1010402568/ecocide-environment-destruction-international-crime-criminal-court.
211. *Id.*
212. *Id.*

Criminal Court (ICC).[213] Mass environmental destruction could also be deemed an international crime, similar to genocide and war crimes, under a currently proposed legal definition: ecocide.[214]

The draft definition of ecocide defines it as "unlawful or wanton acts committed with knowledge that there is a substantial likelihood of severe and either widespread or long-term damage to the environment being caused by those acts."[215] This definition was put forward in June 2021 by the Stop Ecocide Foundation and was drafted by an independent panel of twelve experts from around the world;[216] The original ecocide proposal is nearly fifty years old.[217] The concept was raised by the Swedish Prime Minister Olof Palme at the 1972 U.N. Conference on the Human Environment.[218] The term "ecocide" was also used previously by bioethicist Arthur Galston at the 1970 Conference on War and National Responsibility.[219] Thereafter, several further attempts were made to formalize ecocide as an international crime.[220] Notably, it was also considered in 1998 during the formal establishment of the ICC.[221]

The Stop Ecocide Foundation began its efforts to formalize ecocide as an international crime in 2017.[222] Ecocide, as defined by the Stop Ecocide Foundation Panel, would attach culpability for the crime of ecocide to the creation of a dangerous situation, rather than to specific outcomes.[223] Specifically, "[i]t is the commission of acts with knowledge of the substantial likelihood that they will cause severe and either widespread or long-term damage that is criminalized."[224] Ecocide is thus defined as "a crime

213. *Id.*
214. *Id.*
215. *Id.*
216. *Id.*
217. *Id.*
218. *Id.*
219. *Id.*
220. *Id.*
221. *Id.*
222. *Id.*
223. *Independent Expert Panel for the Legal Definition of Ecocide Commentary and Core Text*, STOP ECOCIDE FOUND. (June 2021), https://static1.squarespace.com/static/5ca2608ab914493c64ef1f6d/t/60d7479cf8e7e5461534dd07/1624721314430/SE+Foundation+Commentary+and+core+text+revised+%281%29.pdf.
224. *Id.*

of endangerment rather than one of material result."[225] This concept is well in line with several other crimes covered by the Rome Statute.[226] One example is the crime of Genocide under Article 6, which has no requirement that the protected group actually be destroyed.[227] Rather, criminality attaches upon the commission of actions "intended to reach that goal."[228]

Companies caught causing environmental damage today are largely punished with monetary penalties, through fines or civil suits.[229] Environmental regulation is covered mostly by administrative, rather than criminal law.[230] Even where there are existing environmental crimes defined by statute, they are usually very specific and require a certain degree of pollution in specific contexts to raise a substantive claim.[231] In most of the world, there is still no legal framework to address mass environmental damage and destruction.[232] The current vacuum allows companies to cause the most damage in regions where there is least protection, then to simply budget for civil suits accordingly.[233]

The establishment of ecocide as an international crime would hold accountable those most responsible for acts or decisions which lead to severe environmental harm by making them liable to criminal prosecution.[234] Ecocide, when applied to e-waste, could have far-reaching impacts in preventing companies from seriously exploiting regions where specific protections are lacking.[235] The ICC could intervene where the crime of ecocide is committed, even if nation states themselves cannot, or will not, prosecute.[236] Producers of products containing materials hazardous to human health, especially where alternatives are available, could then be held accountable for the damage they cause in

225. *Id.*
226. *Id.*
227. *Id.*
228. *Id.*
229. Sean Fleming, *What is Ecocide and can it be prosecuted by the International Criminal Court?*, WORLD ECON. F. (July 1, 2021), https://www.weforum.org/agenda/2021/07/ecocide-environmental-harm-international-crime/.
230. *ECOCIDE & THE LAW*, STOP ECOCIDE INT'L, https://www.stopecocide.earth/faqs-ecocide-the-law (last visited Oct. 21, 2022).
231. *Id.*
232. *Id.*
233. *Id.*
234. *Id.*
235. *Id.*
236. *Id.*

countries where national legislation and enforcement capabilities may be lacking.[237] In addition, those most responsible for dumping e-waste onto developing countries could be forced to answer for their actions in criminal court, rather than escape with a simple fine or slap on the wrist.[238]

Further, corporate success is often-times predicated on both public and investor confidence.[239] The establishment of ecocide as an international crime would significantly curtail corporate immunity by attaching the stigma of criminality to environmental harm. [240] Businesses would be deterred from seriously harmful practices in order to avoid negative financial outcomes, as no reasonable corporate actor aspires to be perceived in the same light as a war criminal.[241] The Stop Ecocide Foundation projects that, as soon as a state submits a proposal, there will be visible changes in the ways corporations behave.[242] Investors, banks, and insurers would begin the process of avoiding potentially dangerous investments, as they will anticipate the law will be in effect a few years down the line.[243] Although there is clear potential for criminalization of ecocide to be an effective tool to establish strong international accountability for environmental violations, it is important to note that it is still very unclear when exactly e-waste management violations would rise to the level of severity required to qualify as ecocide under the definition proposed by the Stop Ecocide Foundation.[244] Therefore, should ecocide ever be recognized as an international crime, cases brought under this claim are likely to be heavily litigated because the severity of each offense would likely need to be examined on a case-by-case basis.

## CONCLUSION

The explosion in production of electronic products in recent decades has resulted in a flood of e-waste, which has garnered

237. *Id.*
238. *Id.*
239. *Making ecocide a crime – Stop Ecocide International*, STOP ECOCIDE FOUND., https://www.stopecocide.earth/making-ecocide-a-crime (last visited Sept. 27, 2022).
240. *See id.*
241. *See id.*
242. *Id.*
243. *Id.*
244. STOP ECOCIDE INTERNATIONAL, *supra* note 231.

international concern and attention.[245] International actors have had varied responses at varying paces to address the e-waste issue, as demonstrated by China and the EU in this Note.[246] Countries are ultimately confronted with environmental, public health, and economic concerns when addressing e-waste management.[247] Although China had enacted a number of laws to address e-waste disposal, recycling, and import issues, as early as 1990, none were as impactful as the January 2018 import ban, which led to hundreds of criminal investigations.[248] While the ban was successful in curbing the massive influxes of e-waste into China, it also highlighted the ability of the e-waste industry to simply move its operations to other countries with economic disadvantages.[249] This heavily suggests that bans on e-waste imports at the national-level do not currently prevent harmful dumping practices globally.[250] Even in countries that have extensive bodies of law governing e-waste management and transport, there continues to be bad actors willing and able to circumvent them.[251] This is demonstrated by the situation in Romania, as it became a popular destination for EU-generated waste following the 2018 Chinese ban on solid-waste imports.[252]

Despite extensive legislation governing e-waste in the EU and the implementation of strict responsibilities for electronics producers, it cannot be overlooked that very few enforcement actions have been recorded by the primary EU enforcement body for non-compliance.[253] This lack of strict enforcement is reflected by the EU's collection rates of e-waste, standing at less than half the weight of electronic products placed onto the market, with a substantial amount still being disposed of through illegal channels.[254] Placing responsibility for the collection and recycling of e-waste squarely on the producer is not enough to achieve an effective e-waste management strategy alone.[255]

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245. *See* U.N. UNIV., *supra* note 7.
246. *Id.*
247. Bhutta et al., *supra* note 11, at 2.
248. *See China's Waste Ban Exposes Missing Links in Recycling*, *supra* note 89.
249. *See id.*
250. *See* RECYCLING MAG., *supra* note 96.
251. *See e.g.*, Pavalasc, *supra* note 173.
252. *See id.*
253. *See* EDIE, *supra* note 134.
254. *See* Pavalasc, *supra* note 173.
255. *See generally* WEEE F., *supra* note 182.

Global e-waste management is complex and there is no simple solution to address the issues it presents.[256] The AAA may provide a better national framework to EPR for the collection and recycling of e-waste, because it sets minimum legal obligations for all actors involved in the WEEE management process and it requires cooperation with an established coordinating body.[257] Further, the establishment of ecocide as an international crime is a promising tool to address the accountability and enforcement obstacles which currently plague the global community when it comes to e-waste.[258] Establishing ecocide as an international crime could provide a powerful avenue for relief where nation states cannot or will not prosecute violations of environmental law.[259] In summation, effectively improving international e-waste management would require coordination between all actors involved in the lifecycles of electronic and electrical products, and bad-actors must be held accountable. AAA and criminalizing ecocide are just two ways which show promise in curbing the exponential rise of global e-waste and its devastating consequences.

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256. *Id.*
257. *Id.* at 14.
258. *See* Fischels, *supra* note 199.
259. *See id.*

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