

TIME TO PULL THE PLUG? EMPOWERING CONSUMERS TO MAKE END-OF-LIFE DECISIONS FOR ELECTRONIC DEVICES THROUGH ECO-LABELS AND RIGHT TO REPAIR

*Emily G. Brown**

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* J.D. Candidate 2020, University of Illinois College of Law; B.A. 2017, Illinois Wesleyan University. I would like to thank my parents, Keith and Trudy Brown, for their constant support in my endeavors, Professors Paul Heald and Arden Rowell for their helpful comments and suggestions, and Professor Rummana Alam for encouraging me in all things legal writing. Special thanks also to Stephen Cotty and my border collie, Apollo, for listening to me constantly think out loud.

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I. INTRODUCTION

The average American household discards around 175 pounds of electronics every year.¹ Electronic waste (e-waste) is a broad category that encompasses electronics, electronic components, and batteries; common household e-waste may include cellphones, televisions, computers, and fax machines.² Furthermore, the amount of e-waste across the world is expected to increase seventeen percent from 2017 to 2020.³ In an effort to reduce the growing amount of e-waste, one proposed solution that is gaining traction across several states is “right to repair” legislation which would require electronic producers to make repair information public and foster repair and reuse of electronics.⁴ The idea is that allowing third-party repairs will ultimately disincentivize consumers from frequently buying new devices and make devices last longer, thereby reducing the number of electronics manufactured and wasted.⁵ However, one of the driving forces behind the e-waste problem is throw-away culture, which still is not effectively addressed by right to repair proposals.⁶

Right to repair is gaining momentum—and rightly so—with legislation now proposed in eighteen states.⁷ Right to repair addresses issues at the ground level by giving consumers the tools to extend the life of their devices through original and third-party manufacturers.⁸ However, right to repair does not

1. Stephen Leahy, *Each U.S. Family Trashes 400 iPhones’ Worth of E-Waste a Year*, NAT’L GEOGRAPHIC (Dec. 13, 2017), <https://news.nationalgeographic.com/2017/12/e-waste-monitor-report-glut/>.

2. *Id.*

3. *Id.*

4. Chaim Gartenberg, *California Becomes the 18th State to Introduce Right to Repair Bill*, THE VERGE (Mar. 8, 2018, 3:00 PM), <https://www.theverge.com/2018/3/8/17097256/california-right-to-repair-bill-apple-microsoft-service-replace-parts>.

5. Damon Beres, *Big Tech Squashes New York’s ‘Right to Repair’ Bill*, HUFFPOST (June 17, 2016, 7:14 PM), https://www.huffingtonpost.com/entry/right-to-repair-new-york_us_57641b5ce4b0853f8bf097fc.

6. Gaia Vince, *The High Cost of Our Throwaway Culture*, BBC (Nov. 28, 2012), <https://www.bbc.com/future/article/20121129-the-cost-of-our-throwaway-culture>.

7. Gartenberg, *supra* note 4.

8. *Policy Objectives*, REPAIR.ORG, <https://repair.org/policy> (last visited Nov. 14, 2018).

educate the consumer about their option to repair as much as it merely provides the tools and resources to repair.

One avenue to provide consumers with knowledge of the environmental impact of their devices is through product labeling.⁹ Product labeling aims to give the consumer more knowledge at the time of purchase about the materials, use, and disposal of the product.¹⁰ Consumers may be less likely to invest in disposable electronics if they have this information readily available at the time of purchase and use.¹¹ Furthermore, an efficient way to disseminate information about environmental impacts is through directly labeling the device packaging or the device's internal information menu, just as food labels and movie ratings are directly incorporated into products.¹²

New product labeling for proper methods of repair and disposal may be more effective than right to repair legislation alone in reducing the production of e-waste. Labeling should hold producers accountable to an independent body so as to be more likely to affect consumer buying habits.¹³ Right to repair legislation through patent or copyright laws are not sufficient to change consumer buying habits because right to repair does not address the underlying issue of a "throw-away" society.¹⁴ Nevertheless, should right to repair succeed, it should be complemented by labeling which educates the consumer about a device's repairability.¹⁵ At this point in time, proposals of right to repair legislation in the US focus on availability of repair parts and diagnostic information, but do not include labeling provisions or notice requirements to educate the consumer.¹⁶

Part II of this note discusses the dangers of e-waste and the current framework of regulating e-waste, both domestically and internationally. Part III considers the obligations placed only on the producer of a product. Additionally, Part III considers the effectiveness of current product rating and labeling in improving consumer knowledge and influencing purchasing decisions. Part IV argues that pairing right to repair and industry-wide product labels with a

9. Jason J. Czarneki et al., *Crafting Next Generation Eco-Label Policy*, 48 ENVTL. L. 409, 447 (2018).

10. *Id.* at 450.

11. See Nor Azila Mohd Noor et al., *Creating Green Consumers: How Environmental Knowledge and Environmental Attitude Lead to Green Purchase Behaviour?*, 5 INT'L J. OF ARTS & SCI. 55, 63–64 (2012) (finding that the level of knowledge correlates to environmental attitude and purchasing behavior in Malaysia, which corresponds to earlier studies on purchasing behaviors).

12. See B.E.S. Bandara et al., *Impact of Food Labeling Information on Consumer Purchasing Decision: With Special Reference to Faculty of Agricultural Sciences*, 6 PROEDIA FOOD SCI. 309, 311–12 (2016) (finding consumers tend to consult the food label to make a purchasing decision).

13. See Czarneki et al., *supra* note 9, at 419 ("[M]any manufacturers and retailers to turn to independent, third-party expert entities to certify that environmental product claims are valid.')

14. Kristi Gartner, *Consumerism, Mass Extinction and Our Throw-Away Society*, THE ART OF (Oct. 13, 2016), <https://www.theartof.com/articles/consumerism-mass-extinction-and-our-throw-away-society>.

15. See Bandara et al., *supra* note 12, at 311–12 (finding consumers tend to consult the food label to make a purchasing decision).

16. Proposed legislation does not provide for product labeling. The states propose an obligation on manufacturers to provide diagnostic and repair tools, information, and software available to purchasers, third party retailers, or both as if they were authorized repairers. H.B. 3030, 100th Gen. Assemb., Reg. Sess. § 10 (Ill. 2017); H.B. 1382, 110th Gen. Assemb., Reg. Sess. § 4 (Tenn. 2017); S.B. 3998B, 2015 Leg., 234th Sess. § 2 (N.Y. 2015).

repairability rating and recycling information will empower and educate consumers to reduce environmental waste while also pressuring producers to be accountable to consumers. This note proposes clear labeling using a rating system—similar to food, entertainment, and recycling ratings—to allow consumers to make objective comparisons and give consumers information about proper disposal of materials in the device.

II. BACKGROUND

A. *What is Electronic Waste and How is it Currently Regulated?*

Electronic waste (e-waste) is a term used to describe electronics that are discarded, often near the end of their useful life, and either disposed or recycled.¹⁷ E-waste includes cell phones, televisions, DVD players, video game consoles, computers, computer monitors, and stereos—but this is not an exhaustive list.¹⁸ It is key to understand the dangers that e-waste poses to appreciate the importance of proper e-waste disposal.

E-waste may be improperly disposed of through municipal waste that ends up in a landfill or through local recyclers who do not have the facilities to process dangerous e-waste.¹⁹ The electronics that comprise e-waste often still have value if they are recycled, refurbished, or reused.²⁰ These products contain small but valuable amounts of resources such as gold, aluminum, and palladium, which can be recovered in many circumstances.²¹ Recycling one million cell phones recovers 33 pounds of palladium, 35,000 pounds of copper, and 772 pounds of silver.²² Disposing of e-waste in landfills or exporting waste to other countries allows for no recovery of these precious metals.²³

E-waste also contains toxic substances, like mercury, nickel, lead, and chromium.²⁴ The United States Environmental Protection Agency (EPA) estimates most e-waste is improperly disposed of in landfills, with only twenty-five percent of e-waste collected for recycling.²⁵ Seventy percent of heavy metals found in landfills comes from electronics, even though e-waste does not make up a majority of landfill waste.²⁶ There is no guarantee that heavy metals and other toxic elements will not leach into water supplies, as even the best landfills are not leak-proof.²⁷

17. *Cleaning Up Electronic Waste (E-Waste)*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/international-cooperation/cleaning-electronic-waste-e-waste> (last visited Nov. 19, 2018).

18. *Electronic waste (E-waste)*, 1 RCRA AND SUPERFUND: A PRACTICE GUIDE, 3d § 2:54 (2018).

19. *Cleaning Up Electronic Waste (E-Waste)*, *supra* note 17.

20. *Id.*

21. *Electronic waste (E-waste)*, *supra* note 18.

22. *Electronics Donation and Recycling*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/recycle/electronics-donation-and-recycling> (last visited Nov. 19, 2018).

23. *Cleaning Up Electronic Waste (E-Waste)*, *supra* note 17.

24. *Electronic waste (E-waste)*, *supra* note 18.

25. *Cleaning Up Electronic Waste (E-Waste)*, *supra* note 17.

26. Jennifer Kutz, *You've Got Waste: The Exponentially Escalating Problem of Hazardous E-Waste*, 17 VILL. ENVTL. L.J. 307, 310 (2006).

27. *Id.* at 321.

Additionally, lithium-ion (Li-ion) batteries are frequently used to power electronics, from iPhones to the Tesla Model S, due to its low maintenance and high energy density.²⁸ Although single-use batteries (e.g., AAA, AA) are generally considered safe to dispose of with household waste, Li-ion batteries pose further dangers when disposed improperly.²⁹ The results of non-recyclable material entering the recycle stream can range from rejection of the entire shipment to the recycling center bearing the cost of sending garbage to a landfill.³⁰ In the case of Li-ion batteries, the dangers can begin before the waste even gets to the sorting process. For example, just recently in 2017, a Li-ion battery started a fire at an ecomaine recycling facility.³¹

Many electronic stores and municipalities collect unwanted or broken electronics, including used batteries, to be properly recycled or disposed.³² However, a large majority of e-waste does not get properly recycled—likely at the fault of either the consumer or the recycler.³³ The EPA has authority to inspect permitted recycling facilities to ensure compliance.³⁴ Recently, the Iowa Attorney General filed a case against Recycletronics after an EPA inspection revealed the company was not properly storing or recycling cathode ray tube (CRT) televisions.³⁵ CRT recycling became a large issue when new television technology began making CRT televisions obsolete in 2009.³⁶

B. Cathode Ray Tube Televisions Exemplify Mass Technology Extinction and Emphasize the Need for Proper Recycling

As new technologies are produced, older devices become less desired and, in some cases, obsolete. One of the most obvious examples that most readers should remember is the transition from analog to digital television signals and

28. *Lithium-Ion Battery*, CLEAN ENERGY INST., <https://www.cei.washington.edu/education/science-of-solar/battery-technology> (last visited Jan. 15, 2020).

29. *Lithium Ion Batteries*, AM. DISPOSAL SERVICES, <https://americandisposal.com/blog/lithium-ion-batteries> (last visited Feb. 22, 2020).

30. *See Recycling – How it Works*, IT'S ALL YOU (May 15, 2019), <https://recyclingpartnership.org/itsallyou/recycling-how-it-works> (“If the wrong materials enter the recycling system, they can damage equipment, harm workers and cause an entire shipment to be rejected, wasting the energy and time that went into sorting and transporting them.”); Josh Clark, *Is What We’re Recycling Actually Getting Recycled?*, HOW STUFF WORKS, <https://science.howstuffworks.com/environmental/conservation/issues/recycling-reality1.htm> (last visited Jan. 15, 2020) (explaining residual waste is thrown out at a cost to the recycling plant).

31. Ecomaine, *Lithium Ion battery fire at ecomaine’s Recycling Facility*, YOUTUBE (Dec. 20, 2017), <https://www.youtube.com/watch?v=WsUjSE-ibKo>.

32. *See Electronics Donation and Recycling*, *supra* note 22 (explaining what types of electronics can be donated or recycled).

33. *See Cleaning Up Electronic Waste (E-Waste)*, *supra* note 17 (finding only 25% of e-waste was recycled in 2009); *see also* Kimberly Button, *20 Staggering E-Waste Facts*, EARTH911 (Feb. 24, 2016), <https://earth911.com/eco-tech/20-e-waste-facts> (finding 12.5% of e-waste is recycled in the United States).

34. *Federal Facilities Inspections: A Guide to EPA’s Access and Inspection Authorities*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/enforcement/federal-facilities-inspections-guide-epas-access-and-inspection-authorities> (last visited Mar. 9, 2020).

35. Petition in Equity at 18–19, *State of Iowa v. Aaron Rochester*, No. EQCV179074 (D. Iowa Jan. 9, 2018); *see also infra* Section (III)(B)(1) (describing the widespread issue of cathode ray tube disposal).

36. Nathaniel Gronewold & Greenwire, *Some See E-Waste Crisis Trailing Switch to Digital TV*, N.Y. TIMES (June 15, 2009), <https://archive.nytimes.com/www.nytimes.com/gwire/2009/06/15/15greenwire-some-see-e-waste-crisis-trailing-switch-to-dig-81110.html>.

the related transition from cathode ray tube (CRT) televisions to LCD and plasma screen televisions.³⁷

The switch from analog to digital television signals in 2009 made most commentators nervous about the increase in e-waste that would be produced, because it would make CRT television sets obsolete without the use of a digital converter.³⁸ Furthermore, higher definition television sets, such as LCD and plasma screen televisions, became increasingly affordable and practical compared to CRT televisions.³⁹ The widespread shift away from CRT televisions over the course of ten to fifteen years created a focus on CRT disposal because CRTs are dangerous and expensive to recycle, and the market for refurbished CRT televisions decreased significantly as a result of the switch to digital television signals.⁴⁰

The industry-wide shift away from CRT televisions demonstrates one situation where disposal became inevitable for the 705 million televisions sold in the US since 1980.⁴¹ Due to the dangerous nature of CRT recycling, there are not a lot of recycling centers that can properly process them.⁴² There are some “recycling” centers that collected CRT televisions, but the televisions now sit in warehouses because the facility could not safely process the CRTs in reality.⁴³ CRT televisions are not the only electronic device to become e-waste, as new devices come out yearly to replace older models.⁴⁴ But, CRTs demonstrates the importance of producers, consumers, and recyclers contributing to the lifecycle of a device and how producers, consumers, and recyclers will have to work together to increase proper and safe recycling of e-waste.

C. Current Frameworks for E-Waste Management

Someone has to be responsible for proper disposal of e-waste, either the state, producer, consumer or recycler. The actor held responsible varies depending on the context, state, and level of actors (international, national, or local). Internationally, most states are bound to the Basel Convention, an international agreement that controls disposal methods of hazardous waste,

37. Ripunjoy Kumar Sarma, *Is it Time to Dump Your CRT TV?*, ECON. TIMES (Aug. 31, 2005, 12:22 AM), <https://economictimes.indiatimes.com/is-it-time-to-dump-your-crt-tv/articleshow/1214930.cms>.

38. See Hannah G. Elisha, *Addressing the E-Waste Crisis: The Need for Comprehensive Federal E-Waste Regulation Within the United States*, 14 CHAP. L. REV. 195, 199 (2010) (noting predictions of an “e-waste tsunami” from Americans disposing of their old televisions); see also Gronewold & Greenwire, *supra* note 36 (finding recyclers experienced an increase in older televisions surrounding the transition to digital television on June 12, 2009).

39. Sarma, *supra* note 37.

40. Elisha, *supra* note 38; see also Adi Robertson, *The Last Scan: Inside the Desperate Fight to Keep Old TVs Alive*, THE VERGE (Feb. 6, 2018, 8:26 AM), <https://www.theverge.com/2018/2/6/16973914/tvs-crt-restoration-led-gaming-vintage> (finding secondhand CRT televisions are specifically desired within the retro-gaming community who have a need for CRT televisions which cannot be bought in stores).

41. Jason Koebler, *America's Television Graveyards*, VICE (Feb. 16, 2017, 7:00 AM), https://motherboard.vice.com/en_us/article/z4gv73/americas-television-graveyards.

42. *Id.*

43. *Id.*

44. Adam Burakowski, *Understanding the Product Cycle: When to Expect New Releases, Updates, Deals, and Discounts*, WIRECUTTER (June 10, 2016), <https://thewirecutter.com/blog/understanding-the-product-cycle-when-to-expect-new-releases-updates-deals-and-discounts/>.

including e-waste, by ensuring the waste is handled in an environmentally sound way through international and domestic laws.⁴⁵ At the national level, legislatures are quick to put the onus of responsibility on producers, holding them financially responsible for the birth and death of their products.⁴⁶ This method is called extended producer responsibility, also known as “product stewardship” in the US.⁴⁷ This note proposes placing some responsibility on the American consumer to properly dispose of e-waste. Most legislation and enforcement efforts seek to regulate larger entities, while regulation of individual persons is effectively left unregulated.⁴⁸ As noted below, there is extensive effort to regulate mass producers of e-waste, but individual consumers are not given clear guidelines or deterrence to properly dispose of e-waste.

Extended producer responsibility is a general policy approach that holds producers financially responsible for disposal of a product at the end of its usable life.⁴⁹ This policy is intended to give producers incentives to change their product design in order to reduce the cost of waste management.⁵⁰ “[Extended producer responsibility] policy features two elements: (1) shifting financial and managerial responsibility upstream, to the producer, and away from the public sector, while maintaining some government oversight; and (2) providing incentives to producers to incorporate environmental considerations into the design of their products and packaging.”⁵¹ Extended producer responsibility policies include product take-back requirements, taxing producers to fund recycling costs, and setting recycling rate targets.⁵² Some policies that are *not* considered extended producer responsibility policies include banning specific items from landfills, implementing recycling subsidies, and charging waste collection fees that vary depending on how much waste is collected.⁵³

In order to comply with extended producer responsibility policies, or to avoid costs associated with compliance (such as paying disposal fees), the producer may make a product more recyclable, improve its lifespan by improving reusability, or reduce the use of material in manufacturing.⁵⁴ A study conducted by the Organization for Economic Co-operation and Development (OECD) determined that recycling rates have increased in countries with extended producer responsibility programs,⁵⁵ although extended producer responsibility is embodied in different ways across the US and across the world.

45. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, *opened for signature* Mar. 22, 1989, 28 I.L.M. 657, art. 2 [hereinafter Basel Convention].

46. Margaret Walls, *EPR Policies and Product Design: Economic Theory and Selected Case Studies*, ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT 4 (Feb. 28, 2006), [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=env/epoc/wgwpr\(2005\)9/final](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=env/epoc/wgwpr(2005)9/final).

47. *Electronics EPR: A Case Study of State Programs in the United States*, PRODUCT STEWARDSHIP INST. 3 (June 3, 2014), [http://www.oecd.org/environment/waste/United%20States%20\(PSI%20-%20Cassel\).pdf](http://www.oecd.org/environment/waste/United%20States%20(PSI%20-%20Cassel).pdf) [hereinafter *Electronics EPR*]; Walls, *supra* note 46, at 4.

48. *Id.*

49. Walls, *supra* note 46, at 4.

50. *Id.*

51. *Electronics EPR*, *supra* note 47.

52. Walls, *supra* note 46, at 8–9.

53. *Electronics EPR*, *supra* note 47, at 9.

54. *Id.* at 4.

55. *Id.* at 35.

D. *The Basel Convention*

The amount of toxic waste in electronic devices leads to a three-fold problem: how to repair slightly damaged devices, how to salvage reusable materials, and how to safely dispose of e-waste.⁵⁶ A large focus at the international level tends to be on how to safely dispose of e-waste, rather than repairing or salvaging materials.⁵⁷ Instead of processing e-waste locally, which is usually a costly and dangerous process due to health and environmental hazards, e-waste is sometimes exported to less developed nations with fewer restrictions.⁵⁸ One study found a third of GPS trackers placed in American e-waste went abroad to countries which do not have proper protections for workers and communities that come in contact with toxic materials.⁵⁹ When looking at the options for domestic control of e-waste, the extent of international transportation of e-waste must also be considered. Exporting e-waste appears to be a quick solution to a long-term problem, and it may allow producers and recyclers to avoid regulation and get around extended producer responsibility policies at a lower cost.⁶⁰ This trend in exporting hazardous waste has led to international agreements, such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention).⁶¹

The Basel Convention is one of the key international treaties controlling disposal of e-waste and other hazardous waste, with over 183 countries party to the treaty—but notably, not the US.⁶² The Basel Convention prevents transporting waste between parties, and nonparties, unless it is authorized by an agreement consistent with requirements of the convention.⁶³ The Basel Convention ensures parties have appropriate facilities to undertake “environmentally sound management of hazardous waste” and prevents importing waste that is not going to be handled in an environmentally sound way by the importing party.⁶⁴

There is minimal statutory guidance in the US limiting on which states’ waste may be exported or the environmental and safety procedures that the importing state must follow.⁶⁵ One of the main barriers to US ratifying the Basel Convention is a lack of implementing domestic legislation.⁶⁶ However, the US

56. Katie Campbell & Ken Christensen, *Where Does America’s E-Waste End Up? GPS Tracker Tells All*, PBS NEWS HOUR (May 10, 2016, 11:07 AM), <https://www.pbs.org/newshour/science/america-e-waste-gps-tracker-tells-all-earthfix>.

57. *Id.*

58. *Id.*

59. *Id.*

60. *Id.*

61. Basel Convention, *supra* note 45.

62. *Id.*; *Frequent Questions on International Agreements on Transboundary Shipments of Waste*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/hwgenerators/frequent-questions-international-agreements-transboundary-shipments-waste> (last visited Feb. 25, 2020) [hereinafter FAQ on Waste Shipment].

63. Basel Convention, *supra* note 45, at art. 4.

64. *Id.* at art. 4.2.

65. See 40 C.F.R. § 262.83 (2018) (listing requirements for waste export but placing restrictions on the country of import beyond requiring consent or an applicable international agreement).

66. FAQ on Waste Shipment, *supra* note 62.

does have some international regulations on transboundary transportation of hazardous waste—the US is party to bilateral agreements with Canada, Mexico, Costa Rica, the Philippines, and Malaysia.⁶⁷ Furthermore, the US has domestic regulations in place which detail the requirements for export of hazardous waste to other states.⁶⁸

III. ANALYSIS

Once a product is sold, the consumer is responsible for its disposal.⁶⁹ Regardless of how much the producer contributes to proper disposal or recycling resources under extended consumer responsibility policies, the consumer may still dispose of a product improperly.⁷⁰ When a product is disposed of improperly, it is likely to cause environmental damage for which someone should be held liable. This leads to the question of who bears responsibility for properly disposing of e-waste? First, this section discusses the necessity to hold both consumers and producers responsible because neither group is likely to unilaterally fix the e-waste problem. Second, this section addresses the insufficiency of existing labeling schemes in educating consumers on their role in proper disposal of toxic e-waste. Third, this section discusses whether right to repair legislation can address the consumer's role or if it may be combined with a labeling initiative to increase efficacy.

A. *Who Bears Responsibility for E-Waste?*

Despite laws and regulations to control the amount of pollution that may be produced, manufacturers do not always stay under the limits, or over time small amounts of pollution can add up to large consequences for nearby communities.⁷¹ It may be first instinct to require producers to pay damages to those who are injured by their pollution—after the fact. However, paying reparations to communities injured by toxic waste dumping is not sufficient to repair damage done to communities; reparations are a short-term solution to a long-term problem, particularly in the context of e-waste.⁷² E-waste should be treated differently than “traditional” toxic waste because the producer is not directly causing the problem. “Traditional” toxic waste in this note is differentiated from e-waste to include broader biological, chemical, and radioactive waste—some of which is directly dumped into the land, water

67. *International Agreements on Transboundary Shipments of Hazardous Waste*, U.S ENVTL. PROT. AGENCY, <https://www.epa.gov/hwgenerators/international-agreements-transboundary-shipments-hazardous-waste#bilateral> (last visited Feb. 25, 2020).

68. *See* 40 C.F.R. § 262.83 (2018) (stating exporting waste is prohibited unless the exporter falls within one of six exceptions and satisfies notice, consent, and reporting requirements).

69. *11 Facts About Recycling*, DO SOMETHING, <https://www.dosomething.org/us/facts/11-facts-about-recycling#fn3> (last visited Feb. 25, 2020).

70. *See id.* (reporting Americans recycle only 30% of recyclable products and Americans throw away, rather than recycle, 28 billion bottles and jars per year).

71. *Environmental Law Violations*, LEGAL INFO. INST., https://www.law.comell.edu/wex/environmental_law_violations (last visited Feb. 25, 2020).

72. Jordan Jackson, *No E-Wasteland for Electronic Waste Disposal: Effective Legislation to Protect Communities Surrounding Landfills*, 18 J. GENDER RACE & JUST. 499, 501 (2016).

sources, or the air by producers rather than through the household waste stream.⁷³ Who pays the bill for damage caused by hundreds of residents who threw electronics in with their regular household waste? Should the producers be held responsible for the consumer inappropriately discarding their used device? The answers to these questions may differ depending on the national and international laws of the state where the item is sold and disposed.

The prevailing trend among electronic manufacturers is to make devices that are not repairable or not easily repairable.⁷⁴ Repairability is sacrificed for the sake of creating thinner or smaller devices.⁷⁵ Non-repairability leads to increased one-owner use of electronics and therefore an increase in the electronic waste that is produced by the consumer.⁷⁶

While design and repairability of devices contributes to obsolescence of technology and e-waste, consumers have no control over these factors. Producers cannot unilaterally be held responsible for America's e-waste problem; a comprehensive solution would hold consumers also partly responsible for disposing of e-waste properly. Consumers should take responsibility for their waste and this may place more pressure from consumers on producers. The US and European Union (EU) have different approaches, as the US focuses on producers but the EU recognizes the consumer's responsibility to dispose of their products.⁷⁷ Another difference is in the EU's transnational approach to addressing e-waste, rather than leaving it to each member state to independently regulate, whereas the US seems to have less comprehensive federal laws addressing production of e-waste.⁷⁸

1. *Producers are Responsible for Environmental Impacts from Cradle to Grave: The US Application of Extended Producer Responsibility*

In the US, extended producer responsibility is also known as "product stewardship."⁷⁹ However, there are some initiatives labelled product stewardship that are not extended producer responsibility, such as "advanced recycling fees . . . because they are neither financed nor managed by producers."⁸⁰ Federally, US laws focus on regulating industrial sources of pollution rather than pollution caused by consumer disposal of products, leaving it for the states to regulate.⁸¹ Extended producer responsibility polices are

73. See Ramon J. Aldag, Toxic Waste, ENCYCLOPAEDIA BRITANNICA, <https://www.britannica.com/science/toxic-waste> (last visited Mar. 9, 2020) (describing toxic waste as any chemical waste capable of causing injury or death).

74. Andrew Thompson, *The Fix Is Out: Product Repairs Get Tougher in New Age of Obsolescence*, NBC NEWS (July 31, 2016, 1:30 PM), <https://www.nbcnews.com/news/us-news/fix-out-product-repairs-get-tougher-new-age-obsolence-n614916>.

75. *Id.*

76. *Id.*

77. Noah M. Sachs, *Planning the Funeral at the Birth: Extended Producer Responsibility in the European Union and the United States*, 30 HARV. ENVTL. L. REV. 51, 51–52 (2006).

78. *Id.*

79. *Product Stewardship*, U.S. ENVTL. PROT. AGENCY, <https://archive.epa.gov/wastes/conserve/tools/stewardship/web/html/index.html> (last visited Mar. 9, 2020); Electronics EPR, *supra* note 47, at 3.

80. *Electronics EPR*, *supra* note 47, at 3.

81. Sachs, *supra* note 77, at 52–53.

typically implemented at the state level and are directed at certain categories of products.⁸² There is not a prevailing extended producer responsibility scheme among the states; some states compel producers to construct a recycling program while others require producers to pay a fee to the state in order to sell their goods.⁸³

In order to protect the environment, some self-governance and collective action is necessary. Self-governance is one justification for public health laws because the population has a desire to collectively protect its health due to an individual's inability to protect their health independently.⁸⁴ This idea may be translated into collectively protecting its environmental health. Widespread populations are susceptible to similar, if not the same, environmental and health threats that come from the habits of consumers collectively.⁸⁵

2. *Producers are Responsible for Environmental Impacts, But Consumers Have to Play Their Part: The EU Application of Extended Producer Responsibility*

The EU's environmental policies have the objective of protecting the environment and human health by taking preventative action and using the "polluter pays principle" (PPP) to rectify environmental damage.⁸⁶ PPP holds the producer responsible for the pollution that they create through their products.⁸⁷ The EU as a whole utilizes extended producer responsibility as a tool for environmental protection and implementation of the polluter pays principle.⁸⁸ PPP requires a causal link between the pollution and the conduct to hold a person, or entity, liable as a polluter.⁸⁹ The European Parliament issued a directive on waste electrical and electronic equipment (WEEE Directive) which requires all member states to enact regulations in accordance with the polluter pays principle.⁹⁰ PPP directs the EU's extended producer responsibility policies, however the producers are not held *independently* responsible by the WEEE Directive for the disposal of their products because there are also requirements for the recyclers and to give notice to the consumer.⁹¹

EU countries are bound by the WEEE Directive that requires member states to adopt policies toward "sustainable production and consumption" by

82. *Id.* at 53–54.

83. Brief for Amicus Curiae Chamber of Commerce of the United States of America in Support of Plaintiff-Appellant at 7–8, *Vizio, Inc. v. Klee*, 2017 WL 2215893 (2d Cir. 2017).

84. Wendy E. Parmet, *Paternalism, Self-Governance, and Public Health: The Case of E-Cigarettes*, 70 U. MIAMI L. REV. 879, 907–08 (2016).

85. *See id.* at 909–11 (explaining that populations have a shared goal of public health and recognize a shared vulnerability to disease that brings them together).

86. Directive 2012/19, of the European Parliament and of the Council of 4 July 2012 on Waste Electrical and Electronic Equipment (WEEE), 2012 O.J. (L 197) 38, 41 [hereinafter EU Directive on WEEE].

87. *Id.* at 38.

88. *Id.*

89. Youri Mossoux, *Causation in the Polluter Pays Principle*, 6 EUR. ENERGY & ENVTL. L. REV. 279, 294 (2010).

90. *See infra* Section (III)(B)(3) (discussing the Electronic Product Environmental Assessment Tool).

91. EU Directive on WEEE, *supra* note 86, at 39–41.

preventing WEEE.⁹² The WEEE Directive defines “WEEE” (waste electrical and electronic equipment) as electrical or electronic equipment “which the holder discards or intends or is required to discard,”⁹³ including any consumables, components, and sub-assemblies that are a part of the product when it is discarded.⁹⁴ Electrical and electronic equipment (EEE) is given a narrower definition by the WEEE directive; it is equipment designed for use within a certain voltage range that is “dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields”⁹⁵

However, despite the fairly specific definition for EEE, the WEEE Directive does not define “polluter.”⁹⁶ The legislature can choose a category of people to hold primarily responsible and the WEEE Directive chooses the producers as the “operator” having control over a certain activity, producing WEEE.⁹⁷ Holding the producers responsible rather than the “polluter” avoids the “infinite regression” that would happen “if one took into account all the people whose intervention was necessary to the defined activity.”⁹⁸ The polluter could potentially be anyone in the product chain: the product designer, the manufacturing plant, the company selling the product, the consumer disposing of the product, or others who were involved between the creation of the product and its final disposition as waste.⁹⁹

While the EU holds the producer of the product financially responsible for the pollution it causes when discarded, the EU also recognizes the necessity of consumers who are discarding the products to have knowledge of proper disposal methods.¹⁰⁰ The WEEE Directive includes a provision that “Member States *may* require producers to show purchasers, at the time of sale of new products, the costs of collection, treatment and disposal in an environmentally sound way.”¹⁰¹ Furthermore, member states shall encourage consumers to “facilitate the process of re-use, treatment and recovery” and participate in the collection of WEEE to contribute to the program’s success.¹⁰²

The WEEE Directive requires states to ensure that producers mark electronics with a symbol (the No Wheelie Bin or No Trash Symbol) indicating that the product has to be collected separately from municipal waste.¹⁰³ Furthermore, states also must make sure households have information about the importance of proper disposal, their options for disposal, and the meaning of the

92. *Id.* at 38–39.

93. Directive 2008/98, of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain directives, 2008 O.J. (L 312) 3, 9.

94. EU Directive on WEEE, *supra* note 86, at 43.

95. *Id.*

96. *See id.* (specifically, not stating a definition for polluter or pollution).

97. Mossoux, *supra* note 89, at 288–89.

98. *Id.* at 289.

99. *Id.*

100. *See* EU Directive on WEEE, *supra* note 86, at 39–40 (stating that consumers must contribute for the successful collection of WEEE).

101. *Id.* at 48.

102. *Id.* at 39–40, 49.

103. *Id.* at 48–49.

No Trash Symbol.¹⁰⁴ The No Trash Symbol is similar to the common three-arrow recycling symbol found on many products in the US and abroad; it functions to alert consumers of how to appropriately dispose of the product.¹⁰⁵ The United States does not require the No Trash Symbol on its products, and thus American consumers lack knowledge of the symbol and its meaning on products.¹⁰⁶

B. Environmental Labeling in the US Remains Inadequate

One initiative for educating consumers is environmental product labeling (eco-labeling), which communicates positive, negative, or neutral properties of a product.¹⁰⁷ A consumer may be encouraged to purchase a product bearing a positive eco-label, alerting the consumer to environmentally friendly characteristics, over a similar product which does not have eco-friendly properties.¹⁰⁸ A negative label may serve to deter consumers from purchasing a product by providing information on health problems that may arise from use, such as warning labels on cigarettes.¹⁰⁹ A neutral label may “be meaningful relative to a scale” and give the consumer information that is not specifically positive or negative.¹¹⁰ An example of a neutral label is a label that provides information about the “water usage, chemicals used, pollution and carbon emissions, and waste disposal” to allow consumers to independently evaluate the characteristics of a product.¹¹¹

The Federal Trade Commission has guidelines for environmental marketing claims.¹¹² While enforceable, these guidelines do not preempt local, state, or federal laws.¹¹³ General principles that apply to environmental marketing include the following: (a) “clear, prominent, and understandable” disclosures, (b) distinguish “between benefits of a product, package, and service,” (c) the claim cannot overstate an environmental benefit or attribute, and (d) comparative claims should “avoid confusion about the comparison” and be substantiated.¹¹⁴

In 2008, a draft of the Eco-Labeling Act of 2008 was circulated by Senator Dianne Feinstein.¹¹⁵ The bill sought to create a voluntary program to award eco-labels to promote products which give consumers scientifically-based and

104. *Id.*

105. *Id.* at 49.

106. See *Crossed-Out Wheelie Bin Statement*, CISCO, <https://www.cisco.com/c/en/us/about/product-innovation-stewardship/product-recycling/weee-compliance/crossed-out-wheelie-bin.html> (last visited Jan. 22, 2019) (stating the symbol is required for products placed on the EU market).

107. Richard B. Stewart, *A New Generation of Environmental Regulation?*, 29 *CAP. U. L. REV.* 21, 134 (2001).

108. Czarnecki et al., *supra* note 9, at 418.

109. Stewart, *supra* note 107, at 134.

110. Czarnecki et al., *supra* note 9, at 418.

111. *Id.*

112. 16 C.F.R. § 260.1 (2020).

113. 16 C.F.R. § 260.1(b) (2020).

114. 16 C.F.R. § 260.3 (2020).

115. Jeffrey J. Minneti, *Relational Integrity Regulation: Nudging Consumers Toward Products Bearing Valid Environmental Marketing Claims*, 40 *ENVTL. L.* 1327, 1349 (2010).

nondeceptive information on the environmental impacts of a product.¹¹⁶ However, the bill was not introduced in the Senate and has not gained traction since its circulation.¹¹⁷

Overall, privately driven labeling schemes seem inadequate to make an impact on the electronics industry as a whole unless they are able to gain national recognition or make the label involuntary. Whether voluntary or involuntary, any e-waste label would need to be nationally recognized in order to be successful. Without customer recognition, the label will not do anything to affect purchasing habits. Further, voluntary labels are just that—voluntary. Without sufficient funding and enforcement power, producers may not have enough incentive to uphold the voluntary label requirements and can easily opt-out without consequences when convenient.

There are three environmental impact labels that are commonly seen on products in the US: two voluntary environmental-impact labeling programs in the US that are well established and recommended, and one involuntary label required by the Federal Trade Commission (FTC).¹¹⁸ The US EPA recommends consumers look for electronics that satisfy the Energy Star (a government administered certification) and Electronic Product Environmental Assessment Tool (EPEAT) (a government-backed, independently administered program) standards.¹¹⁹ EPEAT requires products to satisfy more comprehensive standards for environmental impact than Energy Star and maintains a registry for consumers to search for product ratings.¹²⁰ The FTC requires producers to submit energy costs for certain categories of products and include an EnergyGuide with that information on the product.¹²¹

1. *Energy Star*

Energy Star is a federal program that intends to assist consumers in choosing products that help the environment and save money by using less energy.¹²² The Energy Star label indicates to consumers that a product satisfies standards for low energy consumption that will pass along savings to the consumers via savings on utility bills.¹²³ Ninety-percent of households in

116. *Id.*

117. *Id.*

118. *EnergyGuide Labeling: FAQs for Appliance Manufacturers*, FED. TRADE COMM'N, <https://www.ftc.gov/tips-advice/business-center/guidance/energyguide-labeling-faqs-appliance-manufacturers> (last visited Mar. 9, 2020); *Federal Electronics Challenge, Understanding Eco-labels for Electronics*, U.S. ENVTL. PROT. AGENCY 1 (June 19, 2012), <https://www.epa.gov/sites/production/files/documents/ecolabel.pdf>.

119. *Recommendations of Specifications, Standards, and Ecolabels for Federal Purchasing*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/greenerproducts/recommendations-specifications-standards-and-ecolabels-federal-purchasing#Recommendations> (last visited Feb. 25, 2020).

120. *EPEAT for Manufacturers*, GREEN ELECTRONICS COUNCIL, https://www.epeat.net/documents/purchaser-resources/EPEAT_Basics_Preso_12%200710.pdf (last visited Feb. 25, 2020).

121. *EnergyGuide Labeling: FAQs for Appliance Manufacturers*, *supra* note 118.

122. *ENERGY STAR Overview*, ENERGY STAR, <https://www.energystar.gov/about> (last visited Feb. 25, 2020).

123. *How a Product Earns the ENERGY STAR Label*, ENERGY STAR, <https://www.energystar.gov/products/how-product-earns-energy-star-label> (last visited Nov. 28, 2018).

America recognize the Energy Star label, and millions of Energy Star certified products are sold every month.¹²⁴

Energy Star may be one of the most recognized eco-labels, but it is aimed at saving consumers money through energy efficiency.¹²⁵ Energy Star certification also applies to more than home appliances, buildings and industrial plants can also earn Energy Star certification.¹²⁶ With such a wide range of applicability, the Energy Star label appears to be a symbol of improved environmental quality and less a symbol that informs consumers about substantive characteristics of a product.¹²⁷

2. *EnergyGuide*

EnergyGuide is an example of an ecolabel that assists consumers in reducing their impact on the environment.¹²⁸ The FTC requires several home appliances, including televisions, dishwashers, freezers, and air conditioners, to have an EnergyGuide label.¹²⁹ The EnergyGuide label makes it easier for consumers to compare the long-term costs of a product by providing relevant usage information, typically in the form of an estimated yearly operating cost and estimated yearly electricity usage.¹³⁰ The costs indicated on the EnergyGuide are updated every five years, and newer models may have a different cost than what is shown on the EnergyGuide.¹³¹

The EnergyGuide is only used for larger appliances, as a result many household electronics, such as cell phones, laptops, and electronic gaming systems are not required to have an EnergyGuide label.¹³² Further, EnergyGuide does not provide information on the cost or methods of maintaining or disposing of the product, such as whether the product should be recycled at a special facility or if hazardous materials could be exposed while repairing it.¹³³ Energy Star and EnergyGuide serve to assist the consumer in purchasing products with lower operating costs and lower energy requirements for the duration of a product's useful life, but fail to address the costs associated with the end of a product's life.¹³⁴

124. *ENERGY STAR Overview*, *supra* note 122.

125. *Id.*

126. *Id.*

127. *How a Product Earns the ENERGY STAR Label*, *supra* note 123.

128. *Shopping for Home Appliances? Use the EnergyGuide Label*, FED. TRADE COMM'N, <https://www.consumer.ftc.gov/articles/0072-shopping-home-appliances-use-energyguide-label#faqs> (last visited Mar. 9, 2020).

129. *Id.*

130. *Id.*

131. *Id.*

132. *See id.* (omitting handheld electronics in the list of included products).

133. *See id.* (omitting maintenance and end-of-life information on the label).

134. *See generally id.* (providing information on the costs of using a product); *see also How a Product Earns the ENERGY STAR Label*, *supra* note 123 (requiring products to meet energy use standards to be awarded the Energy Star label).

3. *Electronic Product Environmental Assessment Tool (EPEAT)*

EPEAT is a voluntary environmental certification program to which a producer may submit their products for evaluation.¹³⁵ Manufacturers register their products in EPEAT based on how many required and optional criteria the product meets.¹³⁶ There are three EPEAT ratings—gold, silver, and bronze.¹³⁷ Each rating level indicates a portion of criteria met: bronze is awarded to products that meet all required criteria, silver meets the required criteria plus 50% of the optional criteria, gold meets the required criteria plus 70% of the optional criteria.¹³⁸

The EPEAT online registry allows consumers to search for products based on EPEAT rating, category, geography, or manufacturer.¹³⁹ The online registry gives consumers information on a product's rating, recyclability (based on the EU WEEE Directive), and "end-of-life management."¹⁴⁰ This allows consumers to consider the environmental friendliness of the product's entire lifecycle, from the materials used to manufacture the product to the proper method of disposal.¹⁴¹

EPEAT's difficulties in communicating with the consumer could be due to a lack of transparency. The EPEAT labels and statements of certification do not give detailed information to consumers about the product's characteristics because there are not specific requirements for each level when it is based on a percentage of met requirements.¹⁴² Consumers have to do additional research through the EPEAT registry to find out which optional criteria the product satisfied and whether the product did not satisfy all of the required criteria.¹⁴³ Furthermore, for some products, such as televisions, the consumers must know the product number to find it in the registry.¹⁴⁴

EPEAT guidelines do not require rated products to be labeled with the EPEAT mark, placing a burden on the consumer to obtain information through the EPEAT registry.¹⁴⁵ For EPEAT labels to be a helpful tool for the consumer, they should be directly on the product.

135. *EPEAT Overview*, GREEN ELECTRONICS COUNCIL, <https://greenelectronicscouncil.org/epeat/epeat-overview> (last visited Jan. 30, 2019).

136. *Id.*

137. GREEN ELECTRONICS COUNCIL, *EPEAT PROGRAM GUIDELINES 6* (Jan. 8, 2015), https://www.epeat.net/documents/EPEAT_Program_Guidelines.pdf [hereinafter *EPEAT PROGRAM GUIDELINES*].

138. *Id.*

139. *EPEAT Overview*, *supra* note 135.

140. *See generally LG 55LV340C - TV End of Life Management*, EPEAT, <https://ww2.epeat.net/criteriadisplay.aspx?productid=17819&epeatcountryid=1&category=6> (last visited Nov. 28, 2018) (listing criteria and standards that comprise the End of Life Management score and Design End of Life score).

141. *See EPEAT Overview*, *supra* note 135 (stating EPEAT address the full product life cycle).

142. *EPEAT PROGRAM GUIDELINES*, *supra* note 137, at 6.

143. *Id.*

144. EPEAT, *LG 55LV340C - TV*, <https://ww2.epeat.net/ProductDisplay.aspx?return=searchoptions&action=view&search=true&productid=17819&rating=2&epeatcountryid=1&stdid=3> (last visited Nov. 28, 2018).

145. *EPEAT PROGRAM GUIDELINES*, *supra* note 137, at 10.

C. Improving Label Efforts

One challenge with most ecolabels in the US is the fact that they are voluntary programs. An increase in purchasing products with voluntary environmental certifications may put pressure on producers to manufacture products which satisfy, and exceed, those standards.¹⁴⁶ However, consumers need knowledge of what labels mean in order to seek them out and make it worthwhile for producers to meet the standards voluntarily. Unfortunately, voluntary labels are often confusing for consumers because the meaning of an absence of label is unclear—it could mean the product was not tested or the product failed the tests, and the standards used among different labeling authorities may vary.¹⁴⁷

Another challenge with eco-labeling in the US is that they seem to be focused on energy-saving, and therefore, money-saving features of a product. These labels have proven to be less effective than hoped, as consumers are optimistic about their financial situation and do not believe they are “average in terms of how much energy and money they’ll save.”¹⁴⁸ Consumers have less interest in energy-saving products with a higher purchase price and fail to see how the product would benefit their individual situation.¹⁴⁹ Labels which contain energy consumption and cost/savings information does not mean much to the consumer if it is not personalized to their energy usage.¹⁵⁰

Neither Energy Star nor EPEAT give consumers information on proper e-waste disposal.¹⁵¹ Landfill bans prevent specific electronics, such as CRTs from entering landfills, however these bans increase the amount of e-waste to be recycled and strains recycling resources.¹⁵²

An increase in purchasing products with voluntary environmental certifications puts pressure on producers to manufacture products which satisfy, and exceed, those standards.¹⁵³ Unfortunately, voluntary labels are often confusing for consumers because the meaning of an absence of label is unclear, as it could mean either the product was not tested or the product failed testing, and the standards used among different labeling authorities may vary, leading consumers to make false comparisons.¹⁵⁴

146. See EPEAT, EPEAT ENVIRONMENTAL BENEFITS, <https://www.epeat.net/documents/purchaser-resources/EPEAT-Overview-July-2015.pdf> (last visited Nov. 28, 2018) (noting the consumer’s preference is a demand signal to manufacturers) [hereinafter EPEAT ENVIRONMENTAL BENEFITS].

147. Cf. Sophie Hieke & Jennifer L. Harris, *Nutrition Information and Front-of-Pack Labelling: Issues in Effectiveness*, 19 PUB. HEALTH & NUTRITION 2103, 2104 (2016) (finding voluntary nutrition labeling schemes may lead to consumer confusion on the meaning of the absence of a label and standard serving sizes).

148. *Energy Management: Navigating the Headwinds*, 2016 DELOITTE CENTER FOR ENERGY SOLUTIONS 13–14.

149. *Id.* at 13.

150. *Id.*

151. See Stephanie Tso, *Upgrading Our Electronics and Downgrading Their Environment: How E-Waste Recycling Has Made China Our Backyard Dumping Ground*, 41 WASH. U. J. L. & POL’Y 205, 217–18 (2013) (finding a lack of standards for take-back programs and landfill bans worsen e-waste exportation concerns).

152. *Id.*

153. See EPEAT ENVIRONMENTAL BENEFITS, *supra* note 146, at 4 (noting the consumer’s preference is a demand signal to manufacturers).

154. See Hieke & Harris, *supra* note 147, at 2104 (finding voluntary nutrition labeling schemes may lead to consumer confusion on the meaning of the absence of a label and standard serving sizes).

As discussed, eco-labels address the production or usage of electronics, and intend to inform the consumer's purchase. Right to repair legislation is relevant to the consumer at the end of the device's lifetime. This note next describes right to repair which seeks to give consumers options for extending the useable life of their devices through the original manufacturers or third-party repairers.

D. Right to Repair Legislation Proposed as a Possible Remedy to E-Waste

The "mobile revolution" is changing the electronics repair landscape. Manufacturers have adopted new manufacturing techniques in order to create smaller devices containing more sophisticated technology.¹⁵⁵ This made do-it-yourself repairs more difficult and lead to an increase in independent repair stores.¹⁵⁶ In response, "manufacturers started using copyright laws to keep their repair manuals offline, proprietary fasteners to seal their products, and in some cases, digital rights management to protect their software."¹⁵⁷ The right to repair movement is a push for legislation to mandate manufacturers to make repair guides and replacement parts publicly available.

Nathan Proctor, director of the Right to Repair campaign of the Public Interest Research Group, created a model right to repair bill, including "five things he says are necessary for repair: replacement parts; specialized tools needed for repair; diagnostic software; manuals or schematics; and firmware."¹⁵⁸ One of the challenges facing electronics repair is getting replacement parts, "repair shops have to rely on aftermarket parts or harvest working components from broken devices, which are unreliable or hard at scale."¹⁵⁹

The tinkering community of electronic and mechanical hobbyists are one group pushing for right to repair to preserve their right to explore their devices.¹⁶⁰ Some consumers feel like they do not own their devices unless they are able to repair and tinker with them as they like.¹⁶¹ No doubt those in support for right to repair also remember the days where electronic repair shops were readily available, with only seven percent of electronic hobbyists being less than thirty years old.¹⁶²

Younger consumers are likely to desire the ability to repair and improve their devices independently as well with the proliferation of user-friendly

155. Adam Wernick, *The 'Right to Repair' Movement Wants You to be Able to Fix Your Own Stuff*, PRI (Dec. 24, 2018, 11:30 AM), <https://www.pri.org/stories/2018-12-24/right-repair-movement-wants-you-be-able-fix-your-own-stuff>.

156. *Id.*

157. *Id.*

158. *Id.*

159. Mostafa Sabbaghi et al., *The Current Status of the Consumer Electronics Repair Industry in the U.S.: A Survey-Based Study*, 116 RESOURCES, CONSERVATION, AND RECYCLING 137, 138–39 (2017) [hereinafter *Current Status of the Repair Industry*].

160. Lou Frenzel, *Electronics Still Thrives as a Hobby*, ELECTRONIC DESIGN (May 17, 2018), <https://www.electronicdesign.com/technologies/analog/article/21806520/electronics-still-thrives-as-a-hobby>.

161. Jaymi Heimbuch, *How the DIY Electronics Trend Is Empowering People, Communities, Businesses*, TREEHUGGER (July 5, 2012), <https://www.treehugger.com/gadgets/how-diy-electronics-trend-empowering-people-communities-businesses.html>.

162. Frenzel, *supra* note 160.

Raspberry Pi and Arduino kits.¹⁶³ Raspberry Pi is a low cost computer that enables users to learn programming skills, understand how computers work, and create “digital maker products.”¹⁶⁴ Likewise, Arduino is a low cost, open source microcontroller that allows users with no electronics background to learn programming and create functional electronic products.¹⁶⁵

Some states have already tried to enact “Right to Repair” legislation, the most known being Massachusetts and its automotive repair statute enacted first in 2012.¹⁶⁶ The Massachusetts law led to a national agreement between automobile organizations.¹⁶⁷ Massachusetts has access to more repair information than citizens of other states; for example, Tesla only makes their repair manuals available to Massachusetts residents.¹⁶⁸ Moreover, the Massachusetts ballot question on Right to Repair gave evidence of the public’s desire to have access to information, parts, and tools for vehicle repair.¹⁶⁹ The vehicle right to repair movement may be translated to electronics, especially as vehicles are becoming more automated.

Producers cannot claim patent infringement for repairing devices. “The right of ‘repair’ follows from the exhaustion of a patentee’s right to control the disposition of a patented article after it has been sold.”¹⁷⁰ Under the well-established doctrine of patent exhaustion, a product passes outside the scope of the patent monopoly once it is sold.¹⁷¹ Any restriction on usage after purchase is done through contract law, not patent law.¹⁷² Thus, the rights of the purchaser definitely include repairing broken or spent parts.¹⁷³ “The nature of the patented invention also weighs towards repair.”¹⁷⁴

The patentee’s right to exclude is limited by the doctrine of exhaustion.¹⁷⁵ When a patentee sells their product the limit functions automatically, the product becomes the purchaser’s private property, and the patentee’s patent rights to the product are terminated.¹⁷⁶ Any restriction on the use of the product must be done

163. See David Kushner, *The Making of Arduino*, IEEE SPECTRUM (Oct. 26, 2011, 7:05 PM), <https://spectrum.ieee.org/geek-life/hands-on/the-making-of-arduino> (finding the success of Arduino created a “do-it-yourself revolution” and calling Arduino boards the “go-to gear” for electronic hobbyists); see also Dave Neal, *The Raspberry Pi Is Suddenly the Third Best-Selling Computer Ever*, INQUIRER (Mar. 20, 2017), <https://www.theinquirer.net/inquirer/news/3006780/the-raspberry-pi-is-suddenly-the-third-best-selling-computer-ever> (stating the Commodore 64 is the third most popular platform for general computing, five years after the start of Raspberry Pi).

164. *What is a Raspberry Pi?*, RASPBERRY PI, <https://www.raspberrypi.org/help/what-%20is-a-raspberry-pi> (last visited Jan. 14, 2019).

165. *Introduction*, ARDUINO, <https://www.arduino.cc/en/guide/introduction> (last visited Jan. 14, 2019).

166. MASS. GEN. LAWS ch. 93K, § 2 (2018); MASS. GEN. LAWS ch. 93J (2012) (repealed 2013).

167. *Legislation*, REPAIR ASS’N, <https://repair.org/legislation> (last visited Feb. 20, 2020).

168. Eric Loveday, *Tesla President of Sales and Service Says Program To Allow Owners To Perform Own Repairs Is “In The Works,”* INSIDE EVS (Feb. 18, 2017, 3:00 PM), <https://insideevs.com/tesla-president-of-sales-and-service-says-program-to-allow-owners-to-perform-own-repairs-is-in-the-works/>.

169. *The Repair Association*, REPAIR ASS’N, <https://repair.org/> (last visited Feb 20, 2020).

170. *Surfco Haw. v. Fin Control Sys. Pty. Ltd.*, 264 F.3d 1062, 1066 (Fed. Cir. 2001).

171. *Impression Prods. v. Lexmark Int’l, Inc.*, 137 U.S. 1523, 1531 (2017).

172. *Id.* at 1526.

173. *Id.*

174. *Soff-Cut Int’l, Inc. v. N.E.D. Corp.*, No. CV 03-2972-LGB (VBKx), 2004 U.S. Dist. LEXIS 31158 at *26 (C.D. Cal. Apr. 6, 2004).

175. *Impression Prods.*, 137 U.S. at 1531.

176. *Id.*

through contracts rather than patent rights.¹⁷⁷ The doctrine of exhaustion leads to the right to repair and resell products.

The ability to repair products without infringing is dependent on not crossing the line of reconstruction. The distinction between repair and reconstruction puts limits on the implied right to repair. “. . . [A]s long as reconstruction does not occur or a contract is not violated, nothing in the law prevents a purchaser of a device from prematurely repairing it or replacing an unpatented component.”¹⁷⁸

*E. Right to Repair May Not Solve the Problem of Planned
Obsolescence of Electronics*

Right to repair legislation is beginning to take off in several states across the country.¹⁷⁹ Proposed right to repair legislation creates extended producer responsibility by holding producers responsible for extending the lives of their products by requiring producers to supply repair manuals and parts for their devices.¹⁸⁰ Extended producer responsibility follows the polluter pays model by holding the producer responsible for the full life of their product—from manufacture to disposal.¹⁸¹

The executive director of the Repair Association, an advocate group for right to repair legislation, predicts at least one state will pass a right to repair bill in 2019.¹⁸² If one state passes right to repair legislation, it is likely that there will be a nationwide response similar to what occurred in 2014 when Massachusetts passed an automotive repair bill.¹⁸³ The Massachusetts law became a nationwide standard for the automotive industry, making right to repair advocates optimistic for the results of a single state passing repair legislation.¹⁸⁴

However, right to repair is not a full solution to reducing the amount of e-waste generated. Although the resources for extending product lives would be made available, consumers must take initiative to repair their devices rather than falling prey to old habits of tossing out electronics to make room for a newer model.¹⁸⁵ Right to repair does not mandate repair of used devices, nor does it prevent consumers from discarding usable devices when they are replaced with a newer model. Planned obsolescence of consumer technology may be halted by right to repair, but producers can still use irremovable batteries and prevent

177. *Id.*

178. *Kendall Co. v. Progressive Med. Tech., Inc.*, 85 F.3d 1570, 1575 (Fed. Cir. 1996).

179. Gartenberg, *supra* note 4.

180. Jason Tashea, *The Fix Is In: How Right-to-Repair Laws Can Improve Tech and the Environment*, ABA JOURNAL (Sept. 17, 2018, 6:00 AM), http://www.abajournal.com/lawscribbler/article/the_fix_is_in_how_right_to_repair_laws_can_improve_tech_and_the_environment.

181. *See id.* (pointing out how the right to repair loss extend liability).

182. *Id.*

183. *Id.*

184. *Id.*

185. Kristi Gartner, *Consumerism, Mass Extinction and Our Throw-Away Society*, THE ART OF (Oct. 13, 2016), <https://www.theartof.com/articles/consumerism-mass-extinction-and-our-throw-away-society>.

older devices from updating to new software—as long as they provide the required repair manuals and parts to consumers and third parties.¹⁸⁶

IV. RECOMMENDATION

With or without right to repair legislation being successful in the near future, labeling products with objective repairability and recycling information would help consumers contribute to the effort to reduce e-waste in the US. Current labeling standards, or rather the lack thereof, do not properly inform consumers of the dangers of putting e-waste in landfills nor the reuse and recycling options available to consumers.¹⁸⁷ The EPA appears to focus eco-labeling programs on energy and water efficiency, which is beneficial during a product's useful life, but does not address the issue of how to dispose of the product at the end of its useful life.¹⁸⁸ Above all, any kind of labeling program needs to have widespread recognition to potentially create competition between producers to create the highest rated or most disposal-friendly products and therefore become more effective.

Paternalistic legislation may be necessary to protect public health when there is an informational or cognitive deficiency, or when the health risks are not obvious.¹⁸⁹ However, regulations which require “disclosure of product information or . . . seek to ‘nudge’ people to the choices they would make if they were fully rational actors” may serve the same purpose as legislation which seeks to protect people from health risks.¹⁹⁰ In the case of environmental health, regulations which disclose product information or “nudge” people into making certain choices would be more effective than paternalistic legislation that prevents people from accessing certain products. Right to repair alone does not serve to nudge consumers because it merely gives them the opportunity to repair but does not encourage or direct them to repair rather than replace devices. Rooted in the first sale doctrine, right to repair's ideology also provides a foundation for placing more responsibility on consumers to be responsible for proper disposal because the producer's ownership rights end with the sale of the product.¹⁹¹ Regulations that guide consumers to a specific outcome allows

186. See Tashea, *supra* note 180 (finding that limiting consumers' ability to repair their devices is an industry standard and describing clever ways that companies prevent their devices from being repaired by third parties).

187. See *Introduction to Ecolabels and Standards for Greener Products*, U.S. ENVTL. PROTECTION AGENCY, <https://www.epa.gov/greenerproducts/introduction-ecolabels-and-standards-greener-products> (last visited Feb. 20, 2020) (stating the EPA's commitment to promoting “fact-based decision-making” and initiative to advance water and energy efficiency through the EPA's current eco-label programs: Water Sense, ENERGY STAR, and Safer Choice); see also Fredrik Gronkvist, *Product Regulations in the United States: A Beginner's Guide*, CHINAIMPORTAL (Aug. 6, 2017), <https://www.chinainportal.com/blog/united-states-product-regulations> (finding electronics have no mandatory safety standards in the United States).

188. *Introduction to Ecolabels and Standards for Greener Products*, *supra* note 187.

189. Wendy E. Parmet, *Paternalism, Self-Governance, and Public Health: The Case of E-Cigarettes*, 70 U. MIAMI L. REV. 879, 884–85 (2016).

190. *Id.* at 885.

191. Phillip W. Goter & Veena Tripathi, *Exhaustion and the “Right to Repair”*: Ownership Rights after *Impression Products, Inc. v. Lexmark Intern., Inc.*, JD SUPRA (June 23, 2017), <https://www.jdsupra.com/legalnews/exhaustion-and-the-right-to-repair-87669/>.

consumers to take ownership over their individual environmental impact by contributing to the collective environmental health.

A. *Options for Labeling*

1. *Introduce the Existing EU Symbol to US Consumers*

First, the US should provide education on, or adopt, the No Trash Symbol used by the EU in the WEEE Directive. American consumers need education on the meaning of the symbol and where to find it in order for the symbol to have meaning to consumers in the US market. Embracing the EU's No Trash Symbol reduces some costs for producers because many who sell products internationally already put this symbol on their products to be able to enter EU markets.¹⁹²

2. *Incorporate an Eco-label Rating a Device's Recyclability and Repairability on a Numeric Scale*

Second, adopting a uniform rating scheme that indicates the repairability and recyclability of a product would help consumers make informed purchasing decisions. Further, it would help right to repair make more of an impact on extending the lifespan of electronic devices. Similar to movie ratings and the EnergyGuide cost scale, a label that places the product on an objective scale may alert consumers to proper end-of-life management.¹⁹³ A label rating the product is different from the No Trash Symbol which indicates the product cannot go in the municipal trash stream and does not give information on repairability or safe methods of disposal.¹⁹⁴ Rating a device based on repairability and/or recyclability can deliver more comprehensive information.

One rating option is a numeric identifier indicating to what type of recycler the product should be taken. The current Resin Identification Code (RIC) used on plastic products is one example of this type of label.¹⁹⁵ Consumers can find the RIC, a number from one to seven, inside the recycle symbol on plastic products.¹⁹⁶ The RIC is used to assist in material separation and can help consumers identify what plastic products may be recycled through their local recycling program.¹⁹⁷ The RIC effectively indicates the recyclability of the plastic, since an RIC of one is easy to recycle and an RIC of six is not accepted by most curbside recycling programs.¹⁹⁸ In the context of recycling electronic

192. See *Crossed-Out Wheelie Bin Statement*, *supra* note 106 (describing how a symbol is required for products placed on the EU market).

193. *Shopping for Home Appliances? Use the EnergyGuide Label*, *supra* note 128.

194. EU Directive on WEEE, *supra* note 86, at 35.

195. See Rick Leblanc, *The Meaning of Recycle Symbols on Plastic*, BALANCE SMALL BUSINESS (updated Nov. 20, 2019), <https://www.thebalancesmb.com/what-recycling-symbols-mean-4126251> (stating the corresponding plastics for each RIC).

196. *Id.*

197. *Id.*

198. See *id.* (stating that the RIC of seven is reserved for miscellaneous types of plastic that do not fall within one of the six categories).

products, the number can correlate to the recycling options. In some cases, producers or retailers are required to take-back products at the end of their life;¹⁹⁹ this may be indicated through a numeric code which would give the consumer notice that they should look to the producer or retailer for proper disposal directions.

Another rating option that would complement right to repair legislation is a scale indicating a device's repairability. An example of this is the iFixIt website which provides "free repair guide[s] for everything, written by everyone."²⁰⁰ iFixIt also rates devices' repairability on a scale of one to ten, giving consumers an overview of the factors that contribute, or detract, to the device's repairability.²⁰¹ One study found that sharing information on the repair process has a positive impact on purchase recommendations and future purchasing.²⁰² Therefore, consumers may put pressure on producers to create devices that have a better repairability score. This would force producers to avoid planned obsolescence and think about the long-term wear and tear on their devices.

B. Placement of Labels May Affect Effectiveness

In order to be effective, any product labeling should be present on both the packaging and the device itself. Simply putting recycle information on the product packaging is not sufficient to inform consumers at the end of the device's life—when the packaging has most likely already been disposed. Therefore, it may be more effective to include end-of-life information of a device within the device settings, if possible. In this way consumers can check what the disposal protocol is for their device and it does not require consumers to search for their specific model online or save product packaging. The information, however, should not be included within the "clickwrap," as consumers are unlikely to thoroughly read or locate disposal information within user agreements.²⁰³

C. Eco-Labels May Overcome Challenges Faced by Right to Repair

Uniform and consistent rating which allows comparison among different models of the same product is necessary for this label to be effective. An independent body to review and rate products should be created to administer this labeling scheme. In accordance with extended producer responsibility principles, the producer bears the burden of giving consumers notice, so

199. See *Electronics EPR*, *supra* note 47, at 3–4 (finding retailer take-back and mail take-back to be reasonable options for achieving recycling goals).

200. *Right to Repair*, iFixIT, <https://www.ifixit.com/> (last visited Feb. 25, 2020).

201. See, e.g., *Smartphone Repairability Scores*, iFixIT, <https://www.ifixit.com/smartphone-repairability> (last visited Feb. 25, 2020) (ranking smartphones by awarding them a repairability score from zero to ten, with ten being the easiest to repair).

202. Mostafa Sabbaghi et al., *Business Outcomes of Product Repairability: A Survey-Based Study of Consumer Repair Experiences*, 109 *RESOURCES, CONSERVATION, AND RECYCLING* 114, 121 (2016).

203. See Caroline Cakebread, *You're Not Alone, No One Reads Terms of Service Agreements*, *BUS. INSIDER* (Nov. 15, 2017, 6:30 AM), <https://www.businessinsider.com/deloitte-study-91-percent-agree-terms-of-service-without-reading-2017-11> (citing a survey that indicated 91% of users agree to terms and conditions without ever reading them).

producers should finance the rating board. However, this kind of labeling may be overall beneficial for producers because consumers are more likely to purchase products with repair information.²⁰⁴ Requiring placement of basic repair information—availability of parts and manuals and ability for the user to repair—on the product itself may have a positive impact on consumers which outweighs the burden of creating an independent body to conduct evaluations.

Producers may fear losing their customer base if they do not have to replace products to the “latest and greatest” model and if they can repair their devices through third parties.²⁰⁵ Producers need to shift their focus and build customer loyalty through transparency and customer service. When consumers have an expectation that they can repair their electronic devices, like mechanical devices, and producers meet this expectation, they are building loyalty and increasing the likelihood of the consumer returning and recommending their products.²⁰⁶

Federal legislation would be more effective than state legislation in the case of industry-wide labeling. It should not be left to state legislatures to determine what labeling is appropriate. Right to repair legislation is being introduced at the state level but is often killed by big tech lobbying,²⁰⁷ sometimes claiming that right to repair will open the door to hackers.²⁰⁸ Labeling efforts may be stalled for the same reasons. However, leading companies in the industry may come together to create a governing body to create standards with the threat of federal legislation.

A governing body must be created to determine the standards for products to be labeled and compared against each other properly. A national board would be the best method to uniformly enforce a rating-label scheme. Relying purely on individual corporations to develop a consistent rating scale relative to each other is likely to lead to some products being rated according to unrealistic expectations for usage and performance, resulting in deceptive—or at least unequal—comparisons between products among manufacturers.²⁰⁹

To date, large technology companies such as Apple have been advocating against right to repair legislation and similar efforts.²¹⁰ Apple even confirmed that a co-processor in some of its computers can render the device inoperable if certain parts are replaced with unofficial replacement parts.²¹¹ Such efforts by large technology companies to prevent repair of their devices would be undercut by repair requirements. Rating labels are likely to face similar challenges from

204. Sabbaghi et al., *supra* note 202, at 121.

205. Sara Behdad, *Why Can't We Fix Our Own Electronic Devices?*, UB Now (July 13, 2017), <https://theconversation.com/why-cant-we-fix-our-own-electronic-devices-77601>.

206. *Id.*; Sabbaghi et al., *supra* note 202, at 120.

207. Nick Statt, *Why Apple and Other Tech Companies Are Fighting to Keep Devices Hard to Repair*, THE VERGE (Aug. 3, 2017, 11:55 AM), <https://www.theverge.com/2017/8/3/16087628/apple-e-waste-environmental-standards-ieee-right-to-repair>.

208. Michael Hiltzik, *How Apple and Other Manufacturers Attack Your Right to Repair Their Products*, L.A. TIMES (Nov. 16, 2018, 7:30 AM), <https://www.latimes.com/business/hiltzik/la-fi-hiltzik-right-repair-20181116-story.html>.

209. Statt, *supra* note 207.

210. *Id.*

211. Nick Statt, *Apple Confirms Its T2 Security Chip Blocks Some Third-Party Repairs of New Macs*, THE VERGE (Nov. 12, 2018, 1:51 PM), <https://www.theverge.com/2018/11/12/18077166/apple-macbook-air-mac-mini-t2-chip-security-repair-replacement-tool>.

large technology companies, especially if producers are solely responsible for sustaining the rating board, submitting their products for review, and adding a label onto their product packaging or device information and settings.

Right to repair is likely to produce more legislation for district courts, until the federal circuit creates a bright-line rule between repair and reconstruction. With the ability for consumers to repair devices at will and obtain replacement parts, consumers are given the tools to reproduce patented products.

V. CONCLUSION

E-waste cannot be retroactively addressed; only proactive and prospective actions can affect e-waste policy and improve its environmental impact.

“Policy-makers need to keep in mind that multiple policy instruments are necessary for efficiently accomplishing multiple environmental goals; thus, one instrument cannot, for example, efficiently reduce the hazardous constituents of products and also reduce waste volumes, and comparisons between such instruments should not be made.”²¹²

Right to repair legislation in combination with a uniform, national labeling program tackles e-waste from both sides by putting pressure on producers to create more environmentally friendly products. Right to repair is expected to be passed in at least one state, but that should not be where the effort stops to increase devices’ lifespans.²¹³ Pressure from consumers, in the form of informed purchasing, can also induce producers to produce environmentally responsible devices.

212. Walls, *supra* note 46, at 36.

213. Tashia, *supra* note 180.