

iDump: How the United States Should Use Disposal Bans to Legislate Our Way Out of the Electronic Waste Crisis

Nick Raffaele

Repository Citation

Nick Raffaele, *iDump: How the United States Should Use Disposal Bans to Legislate Our Way Out of the Electronic Waste Crisis*, 39 Wm. & Mary Envtl. L. & Pol'y Rev. 483 (2015), <https://scholarship.law.wm.edu/wmelpr/vol39/iss2/7>

IDUMP: HOW THE UNITED STATES SHOULD USE DISPOSAL BANS TO LEGISLATE OUR WAY OUT OF THE ELECTRONIC WASTE CRISIS

NICK RAFFAELE*

INTRODUCTION

Today, Americans will throw 350,000 cell phones and 130,000 computers in the trash.¹ Rather than responsibly recycling these electronic products, 80% of Americans will simply add these simultaneously toxic and valuable items to the United States' burgeoning landfills.² While these two facts alone would present an alarming dilemma for lawmakers, the electronic waste problem is exacerbated by Moore's Law.³ Gordon Moore, a co-founder of Intel, predicted that the number of transistors that could be feasibly incorporated onto processor chips would double every two years.⁴

Because the number of transistors that can be fit onto tiny processor chips is directly related to their power, speed, and efficiency,⁵ Moore's very accurate prediction has allowed the technological sector to progress at a pace more rapid than most industries.⁶ Indeed, this exponential rate of growth has served as an excellent business model for producers of semiconductor processing technology.⁷ As the technology progresses at an exponential rate, electronic products become obsolete at an equally rapid

* J.D. Candidate, William & Mary Law School, 2015; B.B.A. Business Law and Political Science, University of Miami, 2012. The author would like to thank Jaymie and John Raffaele, Nancy and Charles Valone, and Deanna and Robert Raffaele for all of their love, support, and encouragement throughout his education.

¹ Bryan Walsh, *E-Waste Not*, TIME MAGAZINE (Jan. 8, 2009), <http://content.time.com/time/magazine/article/0,9171,1870485,00.html>, *archived at* <http://perma.cc/9EYV-GUG9>.

² *Id.*

³ *Moore's Law and Intel Innovation*, INTEL, <http://www.intel.com/content/www/us/en/history/museum-gordon-moore-law.html> (last visited Jan. 15, 2015), *archived at* <http://perma.cc/36CV-T3TL>.

⁴ *Id.*

⁵ *See generally* Marshall Brain, *How Microprocessors Work*, HOW STUFF WORKS, <http://computer.howstuffworks.com/microprocessor.htm> (last visited Jan. 15, 2015), *archived at* <http://perma.cc/5FUK-3HQ5> (explaining the role of transistors in the functioning of microprocessors, as well as the general history and function of the devices).

⁶ *Moore's Law and Intel Innovation*, *supra* note 3.

⁷ *Id.*

pace.⁸ Consumers generally desire the latest innovations, and electronics manufacturers reinforce their desire to upgrade by discontinuing support for models of products that are often only a few years old.⁹

Faced with these incentives, it is no surprise that consumers dispose of electronic products at the excessive rates indicated above.¹⁰ As one would expect, the scrap metal industry estimated that the amount of electronic waste has more than doubled in the past five years.¹¹ This is particularly troubling considering the large volume of electronic products being disposed of yearly. In 2010 alone, the United States disposed of 384 million units of electronic products in landfills or through recycling, amounting to 2.44 million tons of electronic waste produced.¹² Unfortunately, the environmentally unfriendly components of personal computers and other electronic devices can make the refurbishing, recycling, and disposal of these items difficult.¹³

Despite the readily apparent potential environmental crisis, lawmakers in Virginia as well as the federal government have done little to ameliorate the disposal of electronic waste in landfills.¹⁴ Indeed, there are currently no specific regulatory authorities or exclusions for electronic waste in federal or Virginia state regulations.¹⁵ Electronic waste is not categorized as a hazardous waste,¹⁶ even though certain components may contain heavy metals (such as lead and mercury) regulated under the

⁸ *Computer and Electronics Recycling*, VA. DEP'T ENVTL. QUALITY, <http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/RecyclingandLitterPreventionPrograms/ElectronicsRecycling/Computerandelectronicsrecycling.aspx> (last visited Jan. 15, 2015), archived at <http://perma.cc/NAB9-9643>.

⁹ Galen Grumen, *Dilemma: The Fast Pace of Consumer Tech Turnover*, INFOWORLD (June 29, 2012), <http://www.infoworld.com/d/consumerization-of-it/dilemma-the-fast-pace-of-consumer-tech-turnover-196356?page=0,0>, archived at <http://perma.cc/7MUD-X45R>.

¹⁰ Megan Treacy, *E-Waste by the Numbers: New Infographic Breaks Down U.S. Electronics Consumption*, TREEHUGGER (Nov. 21, 2012) <http://www.treehugger.com/clean-technology/e-waste-infographic.html>, archived at <http://perma.cc/DYQ7-S47B> (providing an excellent infographic illustrating the extent of Americans' yearly electronic waste disposal).

¹¹ Ian Urbina, *Unwanted Electronic Gear Rising in Toxic Piles*, N.Y. TIMES, Mar. 18, 2013, at A1.

¹² *Facts and Figures on E-Waste and Recycling*, ELECTRONICS TAKEBACK COALITION (June 25, 2014), available at http://www.electronicstakeback.com/wp-content/uploads/Facts_and_Figures_on_EWaste_and_Recycling.pdf.

¹³ *Computer and Electronics Recycling*, *supra* note 8.

¹⁴ *Electronics Waste Management Interim Recommendations*, VA. DEP'T ENVTL. QUALITY, <http://www.deq.state.va.us/Programs/LandProtectionRevitalization/RecyclingandLitterPreventionPrograms/ElectronicsRecycling/Electronicswastemanagementinterimrecommendatio.aspx> (last visited Jan. 15, 2015), archived at <http://perma.cc/L7J4-TUBG>.

¹⁵ *Id.*

¹⁶ *Id.*

Resource Conservation and Recovery Act (“RCRA”).¹⁷ Therefore, legislative steps must be taken to ensure that electronic waste does not make its way into landfills.

Some states have responded with legislation addressing electronics recycling, which can be broken down into two main categories: producer responsibility laws and disposal bans.¹⁸ Producer responsibility laws require electronics manufacturers to provide responsible and free of charge disposal options at all stages of their products’ life cycles.¹⁹ On the other hand, disposal bans criminalize the improper disposal of electronic products in landfills, whether the disposal is made by manufacturers, retailers, or consumers.²⁰ This Note will argue that disposal bans are the more effective legislative option available to confront the electronics waste crisis facing the United States.

To begin this argument, Part I will discuss the environmental considerations that create a need for electronics recycling legislation, noting that electronic waste disseminates toxic chemicals into the atmosphere and is a waste of valuable resources that are financially and environmentally costly to mine. Part II will note the federal government’s failure to legislate and evaluate the current patchwork of state laws, finding that major inconsistencies between these laws make it difficult for consumers to responsibly follow the law and easy for recycling companies to shirk their responsibilities. Part III will analyze Virginia’s Computer Recovery and Recycling Act, arguing that it is an inadequate response to the electronic waste crisis. Part IV will analyze Colorado’s Electronic Recycling Jobs Act, arguing that it is a more measured approach to electronics recycling that can serve as a model for future legislation. Part V will provide recommendations for framing the issue in order to make electronic recycling reform politically attractive for legislatures by focusing on the economic impacts of such legislation

¹⁷ See generally *Resource Conservation and Recovery Act (RCRA)*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/agriculture/lrca.html> (last updated Oct. 21, 2013), archived at <http://perma.cc/62Z7-DJ5F> (summarizing the objectives of the RCRA).

¹⁸ *State by State E-Waste Law Summary*, ELECTRONICS TAKEBACK COALITION (Apr. 11, 2011), available at http://www.electronicstakeback.com/wp-content/uploads/States_Summary_2011.pdf.

¹⁹ *Extended Producer Responsibility State Laws*, PRODUCT STEWARDSHIP INST., http://www.productstewardship.us/?State_EPR_Laws_Map (last visited Jan. 15, 2015), archived at <http://perma.cc/HC8R-VAUT>.

²⁰ *Disposal Bans*, ONTARIO WASTE MGMT. ASS’N (June 2013) <http://www.owma.org/Publications/OWMAReportsandPolicies/tabid/180/ctl/DisplayAttachment/mid/624/AnnotationId/9a98b660-cfd9-e211-9cac-00155d607900/Default.aspx>, archived at <http://perma.cc/K7AF-KWFD>.

rather than environmental considerations. Finally, the Conclusion will contend that either the states or the federal government should implement disposal bans, consistently barring all electronic waste from landfills across the nation.

I. ENVIRONMENTAL DANGERS POSED BY ELECTRONIC WASTE

A. *Toxicity*

An area of utmost concern contributing to the need for effective electronics recycling legislation is the toxicity of the products when they are disposed of in landfills.²¹ Electronic waste contains lead, mercury, arsenic, cadmium, beryllium, and other toxic substances.²² In fact, 40% of all of the lead in United States landfills can be attributed to computer monitors.²³ Even the plastic casings that house many electronics contain polyvinyl chloride, which, along with the other toxins listed above, is released into the air we breathe when incinerated or can seep into the water supply when allowed to decompose in landfills.²⁴

These toxic substances can have severely negative impacts on human health, including poor fetal development and harm to nursing infants.²⁵ They are also detrimental to the health of adults, causing brain, heart, liver, kidney, and skeletal system damage.²⁶ These harmful effects are a result of the persistent, bio-accumulative nature of the toxins.²⁷ Persistent substances are defined as those that are not subject to natural

²¹ *Harmful Effects Caused by Improper Computer and Electronic Waste Recycling*, GREEN CITIZEN, <http://www.greencitizen.com/learn-more/harmful-effects> (last visited Jan. 15, 2015), archived at <http://perma.cc/6CT5-67P7>.

²² Chris Carroll, *High-Tech Trash*, NAT'L GEOGRAPHIC (Jan. 2008), <http://ngm.nationalgeographic.com/2008/01/high-tech-trash/carroll-text/1>, archived at <http://perma.cc/KB42-NAW5>.

²³ *Harmful Effects Caused by Improper Computer and Electronic Waste Recycling*, *supra* note 21.

²⁴ *Id.*

²⁵ *Hazardous Substances in e-Waste*, EWASTEGUIDE.INFO, <http://ewasteguide.info/hazardous-substances> (last visited Jan. 15, 2015), archived at <http://perma.cc/T4ES-CWS3>.

²⁶ *Harmful Effects Caused by Improper Computer and Electronic Waste Recycling*, *supra* note 21.

²⁷ *Persistent, Bioaccumulative, and Toxic Chemicals*, SAFER CHEMICALS HEALTHY FAMILIES, <http://saferchemicals.org/get-the-facts/chemicals-of-concern/persistent-bioaccumulative-and-toxic-chemicals-pbts> (last visited Jan. 15, 2015), archived at <http://perma.cc/7R4Z-W2AN>.

degradation when exposed to the environment.²⁸ Since these toxins do not decompose, they end up being absorbed by living organisms drinking the water or breathing the air that contains them.²⁹ Their bio-accumulative property means that they are stored and concentrated in the tissues of animals as well as human fatty tissues, bones, muscles, and brains.³⁰

As their concentrations in the food supply and consequently the human body increase over time, so do their negative health impacts.³¹ In severe cases, exposure to persistent bio-accumulative toxins can lead to nervous system malfunction, “reproductive and developmental problems, cancer, and genetic impacts.”³² Since electronic products have exhibited the potential to leak these toxins into the atmosphere, electronic waste disposal has been characterized as a “public health emergency” that may pose “significant health risks also for generations to come.”³³

Furthermore, electronics not disposed of in landfills—but stashed away in storage units, attics, and basements—pose their own environmental threats.³⁴ The Environmental Protection Agency (“EPA”) estimates that 180 million televisions, computers, and other electronic components were in storage in the United States as of 2005.³⁵ This improper form of disposal runs the risk of electronics being forgotten about and/or broken, allowing their toxic contents to eventually escape into the atmosphere.³⁶ This possibility is especially alarming considering that “residential households store five times more [electronic waste] than commercial establishments.”³⁷ It is therefore crucial to ensure that affordable and convenient recycling options are widely publicized for, and made available to, individual consumers.

²⁸ *See id.*

²⁹ *See id.*

³⁰ *Id.*

³¹ *Persistent Bioaccumulative and Toxic (PBT) Chemical Program*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/pbt/pubs/fact.htm> (last visited Jan. 15, 2015), *archived at* <http://perma.cc/F2XU-HYY6>.

³² *Id.*

³³ Chiara Frazzoli et al., *Diagnostic Health Risk Assessment of Electronic Waste on the General Population in Developing Countries*, 30 ENVTL. IMPACT ASSESSMENT REV. 388, 388 (2010).

³⁴ *See Statistics on the Management of Used and End-of-Life Electronics*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/osw/conserves/materials/ecycling/manage.htm> (last visited Jan. 15, 2015), *archived at* <http://perma.cc/4C5D-2WHY>.

³⁵ Carroll, *supra* note 22, at 71.

³⁶ *See How to Dispose of Your Toxic Products Responsibly*, S.F. DEP’T ENV’T, <http://www.sfenvironment.org/article/toxic-products-disposal/toxics-product-disposal-for-residents> (last visited Jan. 15, 2015), *archived at* <http://perma.cc/7YJH-TMXV> (noting the danger of leaving outdated computers and electronics in storage).

³⁷ EPA, *supra* note 34.

Even when consumers do the right thing and pass their unwanted electronics on to recyclers, recycling companies do not always properly dispose of the electronic products when they have no profit motive to do so.³⁸ The rapid shift in television technology from cathode ray tubes (“CRT”) to liquid crystal display (“LCD”) flat screens has destroyed the recycling value of the older glass tube televisions.³⁹ While the glass tubes used to be melted down and profitably turned into new units, the obsolescence of CRT technology has destroyed any business incentive to recycle the cathode ray tubes.⁴⁰ As a result of these CRT televisions abruptly becoming financially burdensome for the recycling companies to which they have been entrusted (and the serious image and legal problems that would result if they simply disposed of the electronics in landfills themselves), staggering amounts of CRT televisions and monitors have been abandoned in warehouses the size of football fields,⁴¹ creating mountains of broken glass, billowing lead dust clouds⁴² and a costly clean up task for the state and the warehouse owners.⁴³

The newer LCD televisions and monitors present a similar dilemma, as they have little recycling value (even though they are a current, non-obsolete technology) and are profuse with mercury⁴⁴ (a highly toxic substance that can cause severe neurological defects in developing children).⁴⁵ Both the shift from CRT to LCD technology and now the more recent shift from standard to high definition displays (over three-quarters of United States households use high definition rather than standard definition displays)⁴⁶ have left recycling companies overwhelmed with electronic waste

³⁸ See Ian Urbina, *Unwanted Electronic Gear Rising in Toxic Piles*, N.Y. TIMES, Mar. 19, 2013, at A1, available at http://www.nytimes.com/2013/03/19/us/disposal-of-older-monitors-leaves-a-hazardous-trail.html?pagewanted=all&_r=1&, archived at <http://perma.cc/4R5G-HBT4>.

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ See *id.*

⁴² *Id.*; see generally Lead Poisoning, MEDLINEPLUS, <http://www.nlm.nih.gov/medlineplus/ency/article/002473.htm> (last visited Jan. 15, 2015), archived at <http://perma.cc/YV95-LH86> (noting that the inhalation of lead dust is highly poisonous and can cause “severe emergency symptoms” after a “single high dose”).

⁴³ Urbina, *supra* note 38.

⁴⁴ *Id.*

⁴⁵ *Mercury Health Effects*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/mercury/effects.htm> (last visited Jan. 15, 2015), archived at <http://perma.cc/TZ3A-3N9Y>.

⁴⁶ *High Definition is the New Normal*, NIELSEN, <http://www.nielsen.com/us/en/newswire/2012/high-definition-is-the-new-normal.html> (last visited Jan. 15, 2015), archived at <http://perma.cc/AW48-FANE>.

as consumers rush to upgrade their products, creating a fear that recyclers will eventually abandon their stockpiles due to economic inefficiency.⁴⁷ Clearly any legislative solutions to the electronic waste crisis must discourage improper disposal of these products by all stakeholders at all stages of a product's life cycle. Even after electronic waste has been given to recycling companies, there is evidently still a significant risk that these products will not be disposed of in an environmentally sound manner but rather left to rot in a storage facility.⁴⁸

B. Waste of Resources

A further area of concern is the environmental and, by extension, economic waste created by a failure to recycle electronic products. Many valuable resources and materials go into the production of electronic products, "including metals, plastics, and glass."⁴⁹ When these resources and materials are deposited into landfills rather than responsibly recycled, additional and unnecessary energy must be expended to mine and manufacture these substances again from scratch.⁵⁰ Some of these resources present in electronic products include electricity-conducting metals, such as gold and silver, that can be more safely and cheaply stripped out of motherboards⁵¹ than mined out of delicate rain forests.⁵²

Consequently, recycling these products and materials conserves natural resources and also reduces the energy costs and greenhouse gas emissions associated with creating or mining the materials.⁵³ Reducing the need for mining also mitigates water and air pollution risks related to mining activities.⁵⁴ To put the benefits of recycling electronics into a tangible, numerical perspective: "Recycling one million laptops saves the energy

⁴⁷ See Urbina, *supra* note 38.

⁴⁸ See *id.*

⁴⁹ *Electronics Donation and Recycling*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/epawaste/conservation/materials/recycling/donate.htm> (last visited Jan. 15, 2015), *archived at* <http://perma.cc/GR6P-C4EV>.

⁵⁰ See *id.*

⁵¹ See generally Tracy V. Wilson & Ryan Johnson, *How Motherboards Work*, HOWSTUFFWORKS, <http://www.howstuffworks.com/motherboard.htm> (last visited Jan. 15, 2015), *archived at* <http://perma.cc/UUD7-6KWU> (explaining that a motherboard allows all of the components of a computer (such as a processor or graphics card) "to receive power and communicate with one another").

⁵² See Carroll, *supra* note 22, at 71.

⁵³ EPA, *supra* note 49.

⁵⁴ See *id.*

equivalent to the electricity used by more than 3,500 US homes in a year. For every million cell phones we recycle, 35 thousand pounds of copper, 772 pounds of silver, 75 pounds of gold, and 33 pounds of palladium can be recovered.”⁵⁵ Given these facts, it becomes clear that recycling electronics not only protects the environment from toxic materials potentially being leaked into landfills and water supplies, but also mitigates the environmental costs and damages associated with the production of electronic products. These benefits further underscore the need to properly incentivize all stakeholders in an electronic product’s life cycle to responsibly recycle and dispose of electronic waste.

C. *U.S. E-Waste Disposal Internationally*

Given the considerable toxic risk posed by electronic waste, one might wonder why American lawmakers have not more aggressively sought to undermine the disposal of electronic waste in landfills and the failure of recycling firms to properly dispose of the products donated to them. The answer to this puzzle lies in the United States’ ability to externalize the environmental costs of its poor electronics recycling habits.⁵⁶ It is estimated that 50–80% of the electronics collected for recycling in the United States are eventually exported to foreign countries.⁵⁷ Similarly, as much as 47% of waste exported from eighteen European seaports was illegal as of 2005.⁵⁸

Essentially, while developed countries get the benefit of new technologies, they externalize the environmental costs to developing countries by means of exportation.⁵⁹ China in particular has absorbed a large amount of the electronic waste produced and exported by developed countries.⁶⁰ About 70% of all electronic waste produced globally ends up in China, with Pakistan, India, Bangladesh, Sri Lanka, Cambodia, Vietnam, Thailand, and Malaysia also maintaining major electronic waste markets.⁶¹

⁵⁵ *Id.*

⁵⁶ See *Where Does E-Waste End Up?*, GREENPEACE INT’L, <http://www.greenpeace.org/international/en/campaigns/toxics/electronics/the-e-waste-problem/where-does-e-waste-end-up/> (last visited Jan. 15, 2015), archived at <http://perma.cc/TVD7-J4NG>.

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ See Carroll, *supra* note 22.

⁶⁰ *Id.*

⁶¹ Barun Roy, *A Dangerous Wasteland*, BUS. STANDARD (Sept. 4, 2013), http://www.business-standard.com/article/opinion/barun-roy-a-dangerous-wasteland-113090401146_1.html, archived at <http://perma.cc/T3E4-P35B>.

Most of this electronic waste leaves the United States or European countries under false pretenses, being labeled as “used goods” rather than “electronic waste” even when the products are not functional.⁶² The black markets in developing countries are happy to accept the electronic waste shipped to their locations because of the valuable materials that can be cheaply stripped from the products when informal recycling procedures are utilized.⁶³ As a result of the use of these illegitimate channels, efforts by countries such as China to prevent the importation of electronic waste into their ports have not been effective.⁶⁴

While the poor populations of these countries enjoy the economic benefits of recycling the electronics due to the valuable components they can recover and sell back into the marketplace at a profit,⁶⁵ they do not use sophisticated methods to break the products down and suffer severe environmental and health problems in the process.⁶⁶ Burning, melting, and acid washes are common methods utilized to extract valuable metals such as gold, copper, and lead from electronic components such as wires and circuit boards.⁶⁷ Both young and old members of families participate in the informal recycling process,⁶⁸ often working without protective clothing as the acid baths release toxins such as dioxins, mercury, brominated flame retardants, and heavy metals into the atmosphere.⁶⁹ As a result of these dangerous practices, in certain areas the dust and dirt along the roads is saturated with harmful heavy metals being released by the recycling process.⁷⁰ Of course, these dangerous substances eventually find their way into humans, food, and crops.⁷¹

Considering that Americans have been slow to implement laws protecting their own landfills from electronic waste, it should come with little surprise that the United States has also not taken steps to prevent

⁶² John Vidal, *Toxic E-waste Dumped in Poor Nations, Says United Nations*, GUARDIAN (Dec. 14, 2013), <http://www.theguardian.com/global-development/2013/dec/14/toxic-ewaste-illegal-dumping-developing-countries>, archived at <http://perma.cc/KN6D-QTH9>.

⁶³ *Id.*

⁶⁴ See Carroll, *supra* note 22.

⁶⁵ See Roy, *supra* note 61.

⁶⁶ *Id.*

⁶⁷ See Carroll, *supra* note 22.

⁶⁸ *Id.*

⁶⁹ Nilanjana Bhowmick, *India's Environment Problem: Disposing Electronic Waste*, TIME (May 23, 2011), <http://content.time.com/time/world/article/0,8599,2071920,00.html>, archived at <http://perma.cc/K9JR-4VJD>.

⁷⁰ See Roy, *supra* note 61.

⁷¹ *Id.*

the exportation of its electronic waste to developing countries. The United States, Afghanistan, and Haiti are the only countries that have signed but not ratified the Basel Convention,⁷² an international treaty designed to prevent the transfer of hazardous materials from developed to less developed nations.⁷³ In the absence of any strong legislation or ratified treaties to the contrary, it seems likely that electronics recycling companies will continue to ship unwanted electronics overseas.⁷⁴ In fact, a sting investigation revealed that forty three American recycling firms were willing to ship CRT to foreign buyers without the requisite EPA permission.⁷⁵ Standing in stark contrast, only two recycling firms are currently approved by EPA to export CRT to foreign countries.⁷⁶

Laws banning the disposal of electronic waste in American landfills and by extension requiring recycling of the products will certainly not do anything to stop the flow of illicit waste from the United States to developing countries. Although the recommendation of such legislation is outside the scope of this Note, it seems clear that such legislation will become even more necessary if electronic waste is banned from American landfills (thereby encouraging recycling firms already overwhelmed with product to profitably eliminate their stockpiles through the black market channels described above).⁷⁷

While it may be easy for the United States to dismiss such concerns due to its externalization of the problem, some have suggested that the exportation of electronic waste may come back to directly injure Americans in unexpected ways.⁷⁸ Indeed, a chemist from Ashland University bought

⁷² See Carroll, *supra* note 22.

⁷³ See generally Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, Mar. 22, 1989, 1673 U.N.T.S. 57, available at <http://www.basel.int/Portals/4/Basel%20Convention/docs/text/BaselConventionText-e.pdf>.

⁷⁴ Ben Elgin & Brian Grow, *E-Waste: The Dirty Secret of Recycling Electronics*, BLOOMBERG BUSINESSWEEK (Oct. 14, 2008) <http://www.businessweek.com/stories/2008-10-14/e-waste-the-dirty-secret-of-recycling-electronics>, archived at <http://perma.cc/84GX-C8B2>.

⁷⁵ See Walsh, *supra* note 1.

⁷⁶ *Companies Approved to Export Cathode Ray Tubes for Recycling*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/osw/hazard/international/crts/recycling.htm> (last visited Jan. 15, 2015), archived at <http://perma.cc/4A3Y-F7PN>.

⁷⁷ Lesley McClurg, *New State Law May Lead to Toxic Waste Overseas*, COLO. PUB. RADIO, <http://www.cpr.org/news/story/new-state-law-may-lead-toxic-waste-overseas> (last visited Jan. 15, 2015), archived at <http://perma.cc/Z32J-ZTJL>.

⁷⁸ Ashland Univ. & Basel Action Network, *Research Identifies U.S. Electronic Waste as Likely Source of Toxic Jewelry Imports from China*, BASEL ACTION NETWORK (July 11, 2007), http://ban.org/ban_news/2007/070711_toxic_jewelry_imports.html, archived at <http://perma.cc/HR95-W86A>.

cheap, Chinese-made jewelry from a dollar store in Ohio, and upon analysis his class found an alarming quantity of lead alloyed with copper and tin.⁷⁹ This combination of materials and their proportions suggested that the source of the lead was likely electronic circuit boards.⁸⁰ Considering that China is a major manufacturing center, the United States should not be surprised when the lead we ship to the country in the form of electronic waste makes it back to our shores repurposed into harmful and dangerous manufactured goods.⁸¹ The issue of electronic waste exportation therefore certainly deserves attention if toxic waste is to be reduced on a global as well as a national scale.

II. THE CURRENT PATCHWORK OF STATE LAWS

A. *The Federal Government Has Failed to Legislate*

While the United States has laws addressing the disposal of hazardous waste,⁸² they are filled with loopholes and are not stringently enforced.⁸³ More specifically, the United States does not have a comprehensive law dealing with the disposal and recycling of electronic waste.⁸⁴ Even EPA regulations against the exportation of cathode ray tubes are not policed appropriately,⁸⁵ as evidenced by the discussion of electronic waste exportation above.⁸⁶ Indeed, the Consumer Electronics Association recognizes that electronics recycling is a national issue that has not received national attention, but the organization is working to ensure that citizens of all states have access to responsible disposal options.⁸⁷

It would seem as though the Consumer Electronics Association's goal will have to be accomplished through actions by individual states.⁸⁸ House of Representatives Bill 2284 (112th Congress), also known as the Responsible Electronics Recycling Act, was the most recent attempt at a

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ *Id.*

⁸² See generally 42 U.S.C. §§ 6921–39 (2006).

⁸³ Hannah G. Elisha, Comment, *Addressing the E-Waste Crisis: The Need for Comprehensive Federal E-Waste Regulation within the United States*, 14 CHAP. L. REV. 195, 206 (2010).

⁸⁴ *Id.*

⁸⁵ *Id.* at 208.

⁸⁶ See Walsh, *supra* note 1.

⁸⁷ CONSUMER ELECTRONICS ASS'N, 2013 SUSTAINABILITY REPORT 26 (2013), available at http://content.ce.org/2013_CEA_SR_Packet1.0/www/_pdf/CEA-001_2013SR_6.0.pdf.

⁸⁸ *Id.*

unified federal policy regarding electronics waste.⁸⁹ However, the bill was sent to committee and subsequently died.⁹⁰ Recommending federal action, rather than the current patchwork of state laws is beyond the scope of this Note; however, this Note will recommend a model for new electronics recycling laws, whether they are implemented at the state or federal level.

B. *Producer Responsibility Laws vs. Disposal Bans*

Roughly half of the United States' population is covered by some sort of e-waste law.⁹¹ However, the vast majority of states have implemented producer responsibility laws, while far fewer (including New Hampshire, Massachusetts, New York, and Colorado) have disposal bans.⁹²

In addition to the different stakeholders that are affected by the different types of laws (producer responsibility, as its name implies, applies to manufacturers, while disposal bans apply to all citizens), the laws also vary widely regarding what types of electronics are covered. For instance, New York's disposal ban covers televisions, CRT, desktops, laptops, monitors, computer peripherals, and printers.⁹³ On the other hand, Virginia's producer responsibility law only covers desktops, laptops, and monitors.⁹⁴ Noticeably absent from most of the different state laws are major categories of electronic waste such as cell phones, mp3 players, and video game consoles.⁹⁵ Furthermore, while Illinois covers the full gambit of electronic products with its producer responsibility law (thereby creating a wide range of manufacturers responsible for their products), its disposal ban is much more limited in scope, covering only televisions, desktops, laptops,

⁸⁹ Lynne Peeples, *New E-Waste Regulations Introduced by State and Local Governments*, HUFFINGTON POST, http://www.huffingtonpost.com/2011/07/01/regulation-recycling-electronic-waste_n_888832.html (last visited Jan. 15, 2015), archived at <http://perma.cc/NFU7-FZ6Z>.

⁹⁰ *H.R. 2284 (112th): Responsible Electronics Recycling Act*, GOVTRACK, <https://www.govtrack.us/congress/bills/112/hr2284> (last visited Jan. 15, 2015), archived at <http://perma.cc/MMX7-KKSZ>.

⁹¹ *State Legislation*, ELECTRONICS TAKEBACK COALITION, <http://www.electronicstakeback.com/promote-good-laws/state-legislation/> (last visited Jan. 15, 2015), archived at <http://perma.cc/3XA-NAV9>.

⁹² *States with E-Waste Laws*, NAT'L CENTER FOR ELECTRONICS RECYCLING (Sept. 26, 2010), available at http://www.electronicsrecycling.org/public/UserDocuments/US%20Map%20of%20E%20Waste%20Laws%202010_26_09.pdf.

⁹³ *Summary of U.S. State Laws on Electronic Waste and Disposal Bans*, SUSTAINABLE ELECTRONICS INITIATIVE (June 2012) available at <http://www.sustainelectronics.illinois.edu/Publications/TN10-005.pdf>.

⁹⁴ *Id.*

⁹⁵ *Id.*

monitors, and printers⁹⁶ (thereby allowing the majority of stakeholders to throw away a wider range of devices). These variations illustrate the inconsistency of the United States' recycling policies. Citizens of different states certainly face a great deal of confusion if they are trying to properly and lawfully dispose of electronics. Of course, these inconsistencies also make it easier for recycling companies to shirk their responsibilities by shipping waste to states with less stringent laws.⁹⁷ Whether the issue is addressed at the state or the federal level, the United States is desperately in need of consistent, strong, and well-enforced electronics recycling legislation.

While none of the aforementioned state electronic recycling laws are perfect, some may have substantial and material advantages over others. The remainder of this Note is dedicated to analyzing the content and practical affects of two very different laws belonging to Virginia and Colorado. The laws differ in their enforcement (producer responsibility versus disposal bans) and their scope (different electronic products included in the laws).⁹⁸ While any electronic recycling law is better than none, the Institute of Scrap Recycling Industries supports the use of disposal bans,⁹⁹ as does the Ontario Waste Management Association.¹⁰⁰ Indeed, disposal bans seem to be the most all-encompassing laws and should therefore have the most tangible environmental impacts.¹⁰¹

III. VIRGINIA'S COMPUTER RECOVERY AND RECYCLING ACT

A. Introduction

Virginia's Computer Recovery and Recycling Act went into effect on July 1, 2009.¹⁰² The statute is a producer responsibility law that requires

⁹⁶ *Id.*

⁹⁷ *State Laws are Failing to Control E-Waste Disposal*, KUHN ASSOCIATES LLC, <http://www.kuhnassociatesllc.com/resources/blog/state-laws-are-failing-to-control-e-waste-disposal.html> (last visited Jan. 15, 2015), *archived at* <http://perma.cc/CN6F-8V53>.

⁹⁸ *See supra* Part III; Part IV.

⁹⁹ INST. SCRAP RECYCLING INDUSTRIES, INC., ISRI ELECTRONICS RECYCLING EXPORT POLICY, (2010), *available at* <http://www.isri.org/docs/default-source/default-document-library/isri-electronics-recycling-export-nbsp-.pdf>.

¹⁰⁰ *Disposal Bans*, ONT. WASTE MGMT. ASS'N (June 2013), <http://www.owma.org/Publications/OWMAReportsandPolicies/tabid/180/ctl/DisplayAttachment/mid/624/AnnotationId/9a98b660-cfd9-e211-9cac-00155d607900/Default.aspx>, *archived at* <http://perma.cc/4BHE-Y67W>.

¹⁰¹ *See generally State e-Waste Disposal Bans Have Been Largely Ineffective*, AM. CHEMICAL SOC'Y (Sept. 2013), <http://www.acs.org/content/acs/en/pressroom/newsreleases/2013/september/state-e-waste-disposal-bans-have-been-largely-ineffective.html>, *archived at* <http://perma.cc/F29L-G69H> (stating that the more encompassing a disposal ban is the more effective it is).

¹⁰² *Virginia's Computer Recovery and Recycling Act (2008)*, VA. DEP'T ENVTL. QUALITY, <http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/RecyclingandLitter>

computer manufacturers who sell or market computers in the state of Virginia to file and implement a recovery and recycling plan—free of charge to consumers—with the state.¹⁰³ Only manufacturers with a recovery/recycling plan on file with the Virginia Department of Environmental Quality can legally sell their products in the state of Virginia, encompassing such companies as Apple, Hewlett Packard, Dell, Best Buy (on account of their store brand, Dynex), etc.¹⁰⁴

The law defines “manufacturer” as any entity that manufactures or sells computers in excess of 500 units per year using a brand that they own or are licensed to use, and also includes importers of computer equipment in excess of 500 units per year.¹⁰⁵ These manufacturers must adopt and implement a recovery and recycling plan that provides collection and recycling of their products free of charge to consumers either by means of mail, collection sites, or collection events.¹⁰⁶ Manufacturers must publish a report on their website every year providing the name and contact information of the individual responsible for maintaining their recovery and recycling program, the weight of computer equipment collected, recycled, and reused over the previous calendar year, and a certification that their collection and recycling efforts comply with VA. CODE ANN. § 10.1-1425.38.¹⁰⁷

B. *What Virginia’s Law Does Right*

While the law is far from perfect, it does contain a sprinkling of positive features that can be helpful in this Note’s development of model legislation for electronic waste recycling. First, the statute’s broad definition of “manufacturer” allows the law to capture all of the major players in the computer marketplace in Virginia.¹⁰⁸ It then places an incredibly strong economic incentive for these manufacturers to comply with the law. This is accomplished both by the statute’s prohibition on noncomplying manufacturers selling their products in Virginia,¹⁰⁹ as well as an important

PreventionPrograms/ElectronicsRecycling/VirginiasComputerRecoveryandRecyclingAct.aspx (last visited Jan. 15, 2015), *archived at* <http://perma.cc/F8K7-HFRK>.

¹⁰³ *Id.*

¹⁰⁴ *Id.*

¹⁰⁵ VA. CODE ANN. § 10.1-1425.27 (2008).

¹⁰⁶ VA. CODE ANN. § 10.1-1425.29 (2008).

¹⁰⁷ VA. CODE ANN. § 10.1-1425.30 (2008) (stating that all computer equipment collected under the Computer Recovery and Recycling Act must be recycled or reused in a manner that complies with local, state, and federal law).

¹⁰⁸ VA. CODE ANN. § 10.1-1425.27 (2008).

¹⁰⁹ *Virginia’s Computer Recovery and Recycling Act (2008)*, *supra* note 102.

provision prohibiting retailers from selling products manufactured by nonconforming computer producers.¹¹⁰ Finally, the law avoids the potential problem of recycling companies shirking their responsibilities by storing and abandoning unwanted electronic waste in warehouses through its certification requirement that the collected products are recycled or reused according to local, state, and federal laws.¹¹¹ However, the law also has an alarming amount of weaknesses and holes that prevent it from effectively addressing the electronic waste crisis in Virginia and leave it as a poor example for future legislation.

C. *What Virginia's Law Does Wrong*

While Virginia's Computer Recovery and Recycling Act does an excellent job with its broad definition of "manufacturer," it does a commensurately poor job defining the scope of electronic products covered by the law.¹¹² "Computer equipment" is defined by the statute as a desktop or notebook computer and may include a monitor or other display device.¹¹³ The list of items "computer equipment" does not cover is regrettably much longer. Computer equipment does not include televisions or even computer monitors that contain a television tuner, desktops or notebooks integrated in a "larger piece of equipment and designed or intended for use in an industrial, governmental, commercial, research and development, or medical setting, including diagnostic, monitoring, security, sensing, or control equipment," or any monitor or computer contained within appliances such as refrigerators or ovens.¹¹⁴

The law is equally narrow in its scope regarding the stakeholders to which it applies.¹¹⁵ The statute's collection, recycling, and reuse provisions apply only to computer equipment returned to a manufacturer by a consumer and does not impose any obligation on an owner or operator of a solid waste facility.¹¹⁶ Although the law prohibits retailers from selling computers produced by noncomplying manufacturers, the law simultaneously

¹¹⁰ VA. CODE ANN. § 10.1-1425.31 (2008).

¹¹¹ VA. CODE ANN. § 10.1-1425.38 (2008).

¹¹² *Id.*

¹¹³ See generally *Summary of U.S. State Laws on Electronic Waste and Disposal Bans*, SUSTAINABLE ELECTRONICS INITIATIVE (June 2012) available at <http://www.sustainableelectronics.illinois.edu/Publications/TN10-005.pdf> (illustrating that Virginia's e-waste law generally covers fewer electronic products than do the laws of other states).

¹¹⁴ VA. CODE ANN. § 10.1-1425.27 (2008).

¹¹⁵ *Id.*

¹¹⁶ VA. CODE ANN. § 10.1-1425.28 (2008).

does not place any burden on retailers to collect computer equipment for recycling.¹¹⁷ This provision is particularly heinous considering that only three retailers (Staples, Best Buy, and Office Depot) have recycling programs for the products they sell, while the country's second and third largest electronics retailers (Walmart and Amazon) have no recycling program whatsoever.¹¹⁸

D. Conclusion: Manufacturer Responsibility Laws Are Inadequate to Address the Electronic Waste Crisis

The Virginia Computer Recovery and Recycling Act is a prime example of the inadequacy of producer responsibility laws. While the law properly addresses manufacturer responsibility through its broad definition of manufacturers, its strong financial incentives for manufacturer compliance, and its assurance that computer equipment collected under its provisions is properly recycled or reused, it fails to address many of the issues that have made the electronic waste crisis so prevalent. The law's failure to place any collection burden on retailers is particularly troublesome because common experience would suggest that consumers generally interact with retailers directly much more often than they do with manufacturers. Furthermore, the law does nothing to incentivize consumers to participate in manufacturer's collection and recycling efforts. The law limits incentives to participate because it explicitly excludes solid waste facilities from bearing any responsibility for electronic waste in their possession.¹¹⁹

Additionally, the law fails to address the types of electronic waste most prevalent in the post-PC world, including tablets and smartphones.¹²⁰ As the computing industry continues to shift from traditional, personal computers to new forms like tablets, Virginia's law will become increasingly ineffective. Finally, a lack of oversight of producer responsibility laws has led to widespread fraud.¹²¹ Manufacturers have admittedly been purchasing

¹¹⁷ VA. CODE ANN. § 10.1-1425.31 (2008).

¹¹⁸ See ELECTRONICS TAKEBACK COALITION, ELECTRONICS RETAILER RECYCLING REPORT CARD, (2013) available at <http://www.electronicstakeback.com/wp-content/uploads/Retailer-Report-Card-narrative-July-16-2013.pdf>.

¹¹⁹ VA. CODE ANN. § 10.1-1425.28 (2008).

¹²⁰ See generally Dan Pearson, *Worldwide PC Hardware Sales Shrink Again as Tablet Shift Continues*, GAMES INDUSTRY INT'L (Oct. 10, 2013) <http://www.gamesindustry.biz/articles/2013-10-10-worldwide-pc-hardware-sales-shrink-again-as-tablet-shift-continues>, archived at <http://perma.cc/HC9K-T9YL> (analyzing the reduction of personal computer use worldwide as a result of steadily increasing sales of cheaper Android and iOS based devices).

¹²¹ Urbina, *supra* note 38.

paper trails indicating that they recycled more electronic products than they in fact collected,¹²² eliminating any practical effects of the reporting requirements. This tactic is so standard in the industry that it is commonly referred to as making a “paper transaction.”¹²³ In summary, the Computer Recovery and Recycling Act is a weak law due to its failure to address a wide range of electronic waste, and its failure to incentivize all stakeholders in an electronic product’s life cycle. Therefore, this Note must look to another form of electronic waste law in the search for model legislation to address the electronic waste crisis.

IV. COLORADO’S ELECTRONIC RECYCLING JOBS ACT

A. *Introduction*

Colorado’s Electronic Recycling Jobs Act’s electronic waste disposal ban went into effect on July 1, 2013.¹²⁴ As of that date, it is unlawful for any individual, whether a consumer, manufacturer, retailer, or solid waste facility operator, to dispose of an electronic device with other solid waste in a landfill.¹²⁵ The only exemption in this law allows counties that do not have access to an electronic waste recycling program (after a good faith effort to secure one) to avoid the disposal prohibition upon a county commission vote to exempt their residents.¹²⁶ However, the exemption only lasts for two years, after which time it must be renewed by a new vote of the county commissioners after another good faith effort to secure an electronic waste recycling program for their residents.¹²⁷ This law was passed by Colorado’s state legislature with the intention to promote job growth through the expansion of the electronics recycling industry, to reclaim precious metals needed for manufacturing without the added costs and environmental risks associated with mining the materials, and to prevent toxic chemicals inherent in electronic products from entering water sources after being disposed of inappropriately in landfills.¹²⁸

¹²² *Id.*

¹²³ *Id.*

¹²⁴ COLO. REV. STAT. § 25-17-303 (2012).

¹²⁵ *Id.*

¹²⁶ *Id.*

¹²⁷ *Id.*

¹²⁸ *Colorado Electronic Recycling Bill Promoted by Lawmakers*, HUFFINGTON POST (Mar. 1, 2012, 9:22 am) http://www.huffingtonpost.com/2012/03/01/colorado-electronic-recycling-bill_n_1312951.html, archived at <http://perma.cc/FNW5-SVEF>.

B. What Colorado's Law Does Right

The Colorado Electronic Recycling Jobs Act can be distinguished from Virginia's Computer Recovery and Recycling Act by two positive differences. First, the Colorado statute applies to a much broader range of products than does the Virginia law—including computers, peripherals, printers, facsimile machines, digital video disc players, video cassette recorders, and any other electronic devices specified by a rule promulgated by Colorado's Solid and Hazardous Waste Commission.¹²⁹ The Colorado law also includes video display devices and computer monitors, including laptops, notebooks, ultrabooks, netbook computers, televisions, tablets, slate computers, and electronic books that contain a “cathode ray tube or flat panel screen with a screen size that is greater than four inches, measured diagonally.”¹³⁰ Second, the Colorado statute requires all individuals to responsibly recycle rather than dump their electronic waste and explicitly includes state agencies as parties that must adhere to the disposal ban.¹³¹ Similar to Virginia's laws regarding certification by manufacturers, state agencies in Colorado must ensure that the recycling companies they use are certified to a national environmental certification standard, and the recycling companies must provide this certification upon receipt of electronic waste.¹³²

Notably, Colorado's legislature took care to include provisions providing for immunity of recyclers in regard to private information left on electronic devices by consumers,¹³³ immunity of waste haulers and landfill owners in regard to electronic waste in their facilities (providing they post notice that they do not accept electronic waste),¹³⁴ public education regarding the recycling of electronic waste and the removal of their private information from electronic products,¹³⁵ and an exemption for charitable organizations that they do not have to accept donations of electronic products.¹³⁶ These detailed features make clear Colorado's well-thought-out approach to mitigating the electronic waste crisis in the state.

¹²⁹ COLO. REV. STAT. § 25-17-302 (2012).

¹³⁰ *Id.*

¹³¹ COLO. REV. STAT. § 25-17-304 (2012).

¹³² *Id.*

¹³³ COLO. REV. STAT. § 25-17-305 (2012).

¹³⁴ *Id.*

¹³⁵ COLO. REV. STAT. § 25-17-306 (2012).

¹³⁶ COLO. REV. STAT. § 25-17-307 (2012).

C. *What Colorado's Law Does Wrong*

As impressive as Colorado's Electronic Recycling Jobs Act is, there still remains room for improvement. One major oversight is the code's exclusion of telephones and video display devices with screens smaller than four inches diagonally.¹³⁷ As a result, the statute seems to exclude iPhones and iPods, as well as any other smartphones and mp3 players with screens smaller than four inches measured diagonally.¹³⁸ While one can speculate Colorado's legislature may have thought devices of this size too small to be of environmental concern, this consideration is more than offset by the fact that smartphones have incredibly frequent rates of replacement.¹³⁹ Therefore, there seems to be potential for an immense amount of these ubiquitous devices to end up in landfills. Indeed, in 2009, EPA found that smartphones were disposed of in landfills at a rate of 129 million units per year, while only 11.7 million units per year were collected for recycling nationwide.¹⁴⁰ Therefore, smartphones had a recycling rate of only 8%, compared to a recycling rate of 17% for televisions (of which 22.7 million units were dumped and 4.6 million units were recycled) and 38% for computers (of which 29.4 million units were dumped and 18 million units were recycled).¹⁴¹ Given the small percentage of smartphones recycled and the comparatively massive amount of total smartphones discarded, any electronic recycling legislation would be foolish to exclude this category of devices. This problem could easily be remedied by the Colorado's Solid and Hazardous Waste Commission's promulgation of a new rule banning the disposal of telephones, cellular phones, smartphones, and mp3 players.¹⁴²

Lastly, although the law effectively prevents a large majority of electronic waste from entering landfills in Colorado,¹⁴³ it does nothing to prevent the shipment of electronic waste to landfills in other states.¹⁴⁴ Indeed, even if Colorado legislated in good faith to prevent solid waste from

¹³⁷ COLO. REV. STAT. § 25-17-302 (2012).

¹³⁸ *Id.*

¹³⁹ Roger Entner, *International Comparisons: The Handset Replacement Cycle*, RECON ANALYTICS (June 23, 2011) available at <http://mobilefuture.org/wp-content/uploads/2013/02/mobile-future-publications.handset-replacement-cycle.pdf> (noting that Americans have the shortest replacement cycle for cellular handsets in the world, getting a new phone once every year and nine months on average).

¹⁴⁰ EPA, *supra* note 34.

¹⁴¹ *Id.*

¹⁴² COLO. REV. STAT. § 25-17-302 (2012).

¹⁴³ COLO. REV. STAT. § 25-17-303 (2012).

¹⁴⁴ *Id.*

exiting the state, such legislation would likely not be able to pass the constitutional hurdles presented by the Commerce Clause if challenged by out-of-state recycling companies.¹⁴⁵ Although this might not be an area of concern in which Colorado's legislature has much incentive or ability to regulate, it still remains a weakness in the system that is of importance to this Note. The Commerce Clause will only allow disposal bans to be effective within the states in which they have been enacted, therefore making the promulgation of such legislation into neighboring jurisdictions of critical importance.¹⁴⁶

D. Disposal Bans Are a Model for Future Electronic Waste Legislation

Despite these flaws, Colorado's Electronic Recycling Jobs Act serves as an excellent model for future electronic waste legislation, whether it is being considered by states with no current regulations, states with weak producer responsibility laws in need of reform, or even (perhaps ideally) the federal government. The law addresses many of the holes in manufacturer responsibility laws illustrated by Virginia's Computer Recovery and Recycling Act. It properly incentivizes good behavior in regards to electronics recycling by making it illegal for all stakeholders to dispose of their electronic waste in landfills, including consumers, manufacturers, landfill operators, and retailers.¹⁴⁷ The Colorado law also includes a much broader category of electronics not limited to desktops and notebooks¹⁴⁸ although, as mentioned above, there is certainly room for improvement in this regard. It adequately balances the obligations it imposes on citizens with proper measures of support, such as educational programs,¹⁴⁹ immunity for innocent parties,¹⁵⁰ and an exemption for charitable donations.¹⁵¹ While the law might not be able to prevent the export of electronic waste out of the

¹⁴⁵ See *C&A Carbone v. Town of Clarkstown, N.Y.*, 511 U.S. 383 (1994) (holding that a city ordinance in New York preventing the export of solid waste without first being processed through a local recycling center discriminated against the free flow of commerce into other localities and was therefore unconstitutional).

¹⁴⁶ See *Philadelphia v. New Jersey*, 437 U.S. 617 (1978) (holding that a New Jersey law preventing the import of solid waste into the state was protectionist and violated the Commerce Clause of the U.S. Constitution).

¹⁴⁷ COLO. REV. STAT. § 25-17-303 (2012).

¹⁴⁸ COLO. REV. STAT. § 25-17-302 (2012).

¹⁴⁹ COLO. REV. STAT. § 25-17-306 (2012).

¹⁵⁰ COLO. REV. STAT. § 25-17-305 (2012).

¹⁵¹ COLO. REV. STAT. § 25-17-307 (2012).

state, adoption of disposal bans in neighboring states would eliminate any incentive to engage in interstate transport of such materials. The statute is not perfect, but it offers an excellent model on which other states or the federal government can build.

V. RECOMMENDATIONS MOVING FORWARD

The electronic waste crisis is a significant problem in need of redress.¹⁵² Some states, such as Colorado, have recognized the severity of the problem and have enacted appropriate legislation to counteract the negative effects of our culture's growing reliance on and improper disposal of environmentally costly electronic products.¹⁵³ And yet other states, such as Virginia, have drafted insufficient and weak laws that do not provide proper incentives to recycle and do not adequately address a wide variety of potentially dangerous products.¹⁵⁴ Even worse, many states have failed to take any action whatsoever,¹⁵⁵ with no federal legislation to mitigate their lack of regulation.¹⁵⁶

Although the electronic waste crisis clearly presents a serious environmental concern, framing the issue as such might not provide the most efficient means to catalyze change in federal or state policy. It is a commonly accepted tenant of political science that elected representatives are cognizant of and responsible to the desires of their constituents,¹⁵⁷ at least to a certain extent (interest groups and their own practical and moral judgments influence their decision-making as well).¹⁵⁸ Given that elected

¹⁵² See generally *Who Gets Stepped On?*, E-STEWARDS, <http://e-stewards.org/learn-more/for-consumers/effects-of-e-waste/who-gets-stepped-on/> (last visited Jan. 15, 2015), archived at <http://perma.cc/9XK3-KPAJ> (providing a general description of the electronic waste crisis).

¹⁵³ Ryan Budnick, *Electronic Waste No Longer Allowed in Trash in Colorado Starting July 1*, DENVER CHANNEL (May 18, 2013) <http://www.thedenverchannel.com/news/local-news/electronic-waste-no-longer-allowed-in-trash-in-colorado-starting-july-1>, archived at <http://perma.cc/XS9K-FC2S>.

¹⁵⁴ See *Computer and Electronics Recycling*, *supra* note 8 (admitting that the burden for recycling electronics lies with manufacturers and that consumers' participation in mitigating the problem is purely voluntary).

¹⁵⁵ *Laws*, NAT'L CENTER FOR ELECTRONICS RECYCLING, <http://www.electronicrecycling.org/public/contentpage.aspx?pageid=14> (last visited Jan. 15, 2015), archived at <http://perma.cc/N4K9-WD84>.

¹⁵⁶ See generally Elisha, *supra* note 83 (calling for federal legislative action in regards to the electronic waste crisis).

¹⁵⁷ For an illustrative historical occasion of American constituents influencing their Congressman, see *Constituents Tell Their Senator How to Vote*, U.S. SENATE, http://www.senate.gov/artandhistory/history/minute/Constituent_Complaints.htm (last visited Jan. 15, 2015), archived at <http://perma.cc/6TDY-69P3>.

¹⁵⁸ See generally Steve Frantzick, *Understanding Congressional Decisions Through Vectors*, DIRKSEN CONG. CENTER, available at <http://www.dirksencenterprojects.org/#vector> (accessed

representatives consider the opinions of their constituents, polling regarding the political priorities of Americans can give us an educated perspective in regard to what sort of legislation is likely to be supported.¹⁵⁹ Thought of in other terms, the context in which any legislation is presented to the public or to legislatures may determine its likelihood to become law.¹⁶⁰

In recent years, the economy has been the most prominent issue on voters' minds, as exhibited in the 2012 presidential election.¹⁶¹ A full 60% of voters in 2012 named the economy as the most important issue on their minds during the presidential election that year.¹⁶² On the contrary, environmental concerns generally command much less of Americans' attention, illustrated by the fact that only twelve percent of the American population actively considers the environmental impact of the products they buy.¹⁶³ As a result, framing electronic waste legislation as an opportunity for economic growth might be the most prudent means by which legislatures and their constituents can be more effectively motivated to champion reform.¹⁶⁴

Given the abundance of factual support on the issue, legislatures should have no problem presenting the need for electronic waste legislation as an economic imperative. Due to the added requirements and complicated processes of proper electronic waste disposal, recycling sustains ten jobs to every one landfill job (per ton of waste).¹⁶⁵ Not only does recycling require more labor and therefore support more jobs than competing industries, but

by selecting Download Now!) (detailing the many factors that play a role in congressional decision-making).

¹⁵⁹ See generally Glenn Davis, *Statistics Don't Lie; People Do: The Science of Political Polling*, INDEP. VOTER NETWORK (Jan. 8, 2014), <http://ivn.us/2014/01/08/statistics-don't-lie-people-science-political-polling/>, archived at <http://perma.cc/6M2K-W2DN> (providing an overview of the reliability of scientific political polling).

¹⁶⁰ See generally FRAMING AMERICAN POLITICS (Karen Callaghan & Frauke Schnell eds.) (2005) (discussing the effects of framing debates on outcomes in the United States' political process).

¹⁶¹ Joe Von Kanel, *Exit Polls: Top Issues for Voters*, CNN (Nov. 6, 2012), <http://politicalticker.blogs.cnn.com/2012/11/06/exit-polls-top-issues-for-voters/>, archived at <http://perma.cc/YZZ2-QJQA>.

¹⁶² *Id.*

¹⁶³ NEIL Z. STERN & WILLARD N. ANDER, GREENTAILING AND OTHER REVOLUTIONS IN RETAIL 58 (2008).

¹⁶⁴ See generally Heather L. Drayton, Note, *Economics of Electronic Waste Disposal Regulations*, 36 HOFSTRA L. REV. 149 (2007) (positing that economic incentives are needed to encourage electronics recycling and concluding that all stakeholders should collaborate to develop an environmentally friendly and economically efficient plan, including a disposal ban).

¹⁶⁵ *Electronic Waste Disposal Ban Takes Effect July 1, 2013*, BOULDER COUNTY, <http://www.bouldercounty.org/doc/rc/ewfactsconsumers.pdf> (last visited Jan. 15, 2015).

the sector has also been growing at a much faster rate than the economy in general.¹⁶⁶ Indeed, “[w]hile employment in the U.S. grew only 2.1% annually between 1967 and 2000, the recycling industry saw an 8.3% increase in employment.”¹⁶⁷

Colorado undoubtedly recognized this opportunity to protect their landfills from hazardous waste while simultaneously taking advantage of the resultant accelerated economic growth.¹⁶⁸ By naming the legislation the “Electronic Recycling Jobs Act” and focusing on the positive impact the legislation would have on the state’s economy, Colorado’s legislature was able to pass legislation criminalizing what used to be common behavior in the state without receiving any significant negative blowback from their constituents (as indicated by its bipartisan nature).¹⁶⁹ It would seem as though the content and presentation of the law represented a win-win scenario for all stakeholders involved by mitigating damage to the environment without sacrificing economic prosperity in the state. Certainly other jurisdictions can learn from Colorado’s successful legislative effort when framing the issue for their constituents.

CONCLUSION

The electronic waste crisis poses serious risks of creating toxic conditions in landfills and the water supply as hazardous materials are dumped indiscriminately in landfills.¹⁷⁰ Simply throwing away electronics also wastes valuable natural resources that are environmentally risky to mine and cost significant amounts of energy to recover (pumping carbon dioxide into the atmosphere in the process).¹⁷¹ Given the severity of the threats to the environment and the ever-increasing adoption of electronics into all aspects of our daily lives, it is a moral imperative that the government ensures all stakeholders are properly incentivized to responsibly dispose of their obsolete electronic products.

¹⁶⁶ *Recycling Means Business*, INST. FOR LOCAL SELF-RELIANCE (Feb. 1, 2002), <http://www.ilsr.org/recycling-means-business/>, archived at <http://perma.cc/A4PA-Y4TE>.

¹⁶⁷ *Id.*

¹⁶⁸ *See Resource Conservation: Economic Benefits*, U.S. ENVTL. PROTECTION AGENCY, <http://www.epa.gov/wastes/conservation/tools/rmd/econ.htm> (last updated Nov. 1, 2013), archived at <http://perma.cc/CU4T-7QDQ>.

¹⁶⁹ *Bipartisan Electronic Recycling Jobs Act Becomes Law*, LA JUNTA TRIBUNE-DEMOCRAT, Apr. 25, 2012, at 8.

¹⁷⁰ *E-Waste in Landfills*, ELECTRONICS TAKEBACK COALITION, <http://www.electronicstakeback.com/designed-for-the-dump/e-waste-in-landfills/> (last visited Jan. 15, 2015), archived at <http://perma.cc/XP66-J89B>.

¹⁷¹ Carroll, *supra* note 22.

Disposal bans offer the proper incentive structures to ensure that electronic waste does not make its way into landfills because they affect all stakeholders in the life cycle of electronic products. However, these laws will only be successful on a grand scale if they are adopted by a large majority of the states or if sweeping legislation is enacted by the federal government.¹⁷² Stakeholders in one community cannot be allowed to shirk their responsibility to recycle by transferring their waste to another jurisdiction's landfill. Additionally, these laws must encompass the full gambit of electronic products that permeate American life today, especially by including smartphones and tablets in the post-PC world.

States with producer responsibility laws such as Virginia should take the next logical step of enacting disposal bans in order to ensure that all stakeholders are responsible for their actions. Additionally, states such as Colorado should work to modernize their electronics recycling statutes, ensuring that contemporary products such as smartphones and tablets are included. Finally, EPA must become more aggressive in policing the export of electronic waste to other countries by American recycling firms. Strict oversight should be implemented in order to ensure that the recycling companies financially benefitting from disposal bans are in fact disposing of the electronic waste properly. A sustainable model of electronic waste disposal must be established before American lives are swallowed up by our constantly rising piles of toxic electronic waste.

¹⁷² Elisha, *supra* note 83.