

May 2008

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Recommended Citation

Templeton, Nicola J. (2008) "The Dark Side of Recycling and Reusing Electronics: Is Washington's E-Cycle Program Adequate?," *Seattle Journal for Social Justice*: Vol. 7 : Iss. 2 , Article 21.

Available at: <https://digitalcommons.law.seattleu.edu/sjsj/vol7/iss2/21>

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The Dark Side of Recycling and Reusing Electronics: Is Washington's E-Cycle Program Adequate?

Nicola J. Templeton¹

INTRODUCTION

Although electronic technology has contributed to immense advances in modern society,² it has also created a rapidly growing toxic waste stream.³ By 2010, there will be twice as many televisions and computers in Washington State as there are residents.⁴ The cathode ray tube (CRT) monitors that become obsolete in Washington between 2003 and 2010 will alone produce approximately twenty-one million pounds of lead waste.⁵ Because electronic waste ("e-waste") is hazardous,⁶ it is difficult and expensive to recycle and dispose of safely.⁷ Therefore, rather than process e-waste domestically, it is often cheaper to ship the e-waste to developing countries,⁸ which are ill-equipped to safely handle it. Prior to the implementation of Washington's E-Cycle Program, the Washington Department of Ecology estimated that approximately 50 percent of the state's e-waste collected for "recycling" was exported to developing countries such as China.⁹

It is fundamentally unjust for the United States to ship toxic e-waste it does not want in its landfills to poor, developing countries in the name of "recycling" and "reuse." The United States' good intentions of protecting its own citizens and environment should not be effectuated at the cost of the health and environment of the world's poorest nations, which neither generate the waste, nor have the ability to safely manage the waste. Moreover, the exported toxic e-waste is now coming back to haunt the United States: recent studies have shown that high levels of lead in cheap

imports from China can be traced to e-waste exported for “recycling” in China.¹⁰

Washington’s new Electronic Product Recycling Program (E-Cycle Washington),¹¹ which became effective on January 1, 2009,¹² includes Extended Producer Responsibility (EPR)¹³ and is thus a major breakthrough in e-waste policy in the United States.¹⁴ Nonetheless, the regulations may not be far-reaching enough to prevent the state’s e-waste from being openly burned or dumped in developing countries, drastically affecting the poor populations of those countries, the environment, and now, indirectly, our own children.

This article argues that in order to prevent the burdening of developing nations with Washington’s e-waste, manufacturer responsibility should be increased by setting limits and phase-out dates on the use of hazardous substances in electronics, by imposing responsibility on manufacturers for e-waste generated by large corporations and government,¹⁵ and by requiring downstream manufacturer responsibility for toxic electronic products and components. In addition, Washington should broaden the definition of electronic products covered by its legislation, emphasize reuse, and take additional steps to ensure public awareness of the hazards e-waste poses and the importance of responsible recycling. However, because the effectiveness of state action is limited until there is a federal ban on toxic waste exports to developing nations, citizens and state representatives also need to demand that the United States ratify both the Basel Convention and the Basel Ban Amendment.

Section I provides background to the problem of e-waste by defining and describing e-waste and by explaining why e-waste is exported. Section I also discusses the social justice implications of exporting e-waste, with a focus on exports to China for “recycling” and to Nigeria for “reuse.” Section II describes Washington’s new Electronic Product Recycling Program. Section III explores potential weaknesses of Washington’s e-waste laws and sets forth proposals to strengthen the Program; to

incentivize the design and manufacture of less toxic, more recyclable electronic products; to prevent toxic e-waste exports to developing countries; and to help developing countries bridge the digital divide. Finally, Section IV concludes that unless citizens are content with sending their toxic waste to poor, developing nations that are unable to safely handle it, Washington's e-waste laws should be amended and the United States should ratify the Basel Convention and Basel Ban Amendment.

I. BACKGROUND TO THE PROBLEM OF E-WASTE

In order to evaluate the potential successes and failures of Washington's e-waste regulations, it is necessary to understand the nature and extent of the e-waste problem. This section defines and describes e-waste, explains why e-waste is the fastest growing waste stream in the industrialized world, and explains what makes e-waste toxic. This section then discusses the factors and policies that cause e-waste to be exported to developing countries and explains why exporting e-waste is fundamentally unjust.

A. What is E-waste?

E-waste consists of electronic products that are discarded because of malfunction, exhaustion, or obsolescence.¹⁶ It includes a wide range of everyday appliances, such as computers, televisions, batteries, light bulbs, household appliances, and cell phones, as well as the component parts of these products, such as CRTs¹⁷ and circuit boards.¹⁸ As a rapidly growing and highly toxic source of waste,¹⁹ e-waste presents a serious environmental and social problem.

E-waste is the fastest growing waste stream in the industrialized world.²⁰ Rapid technological innovation creates a constant temptation to discard working electronics for newer, smaller generations of products—often at lower costs than the older versions.²¹ Thus, working electronics are inevitably discarded and replaced instead of being repaired or upgraded.²² Every single hour, four thousand tons of e-waste is discarded worldwide.²³

Each year, an estimated one hundred million computers, monitors, and televisions become obsolete in the United States,²⁴ while Seattle households alone generate over two hundred and fifty-one thousand of these electronic devices.²⁵ In addition, the Washington Department of Ecology estimates that, between 2003 and 2010, more than 4.5 million computer processing units, 3.5 million CRT monitors, and 1.5 million flat panel monitors will become obsolete in Washington.²⁶ However, these numbers may not even be a true reflection of the actual e-waste problem. Because many users overestimate the value of used electronic equipment or are simply unsure of how to handle it, an estimated 75 percent of old electronics are currently in storage and are yet to enter the ever-growing stream of e-waste.²⁷

E-waste is highly toxic because it contains dangerous levels of lead, mercury, cadmium, hexavalent chromium, beryllium, barium, and nickel, as well as other components that may release toxic fumes into the atmosphere on incineration. In addition, electronics research involves continual exploration for useful materials not previously used in the industry, especially those with semiconducting properties.²⁸ Many of these materials are incorporated into new electronic products before any detailed data about their ecological, environmental, or health effects is generated,²⁹ thus adding unknown dangers to the toxic e-waste stream.

Lead, contained in CRTs and computer circuit boards, is a major, and particularly toxic, component of e-waste.³⁰ Lead is extremely dangerous because it damages the nervous and endocrine systems and causes blood, kidney, and brain disorders, especially in children who are affected by low levels of lead exposure.³¹ Higher levels of lead exposure can also affect adults by raising blood pressure and by causing fertility problems and nerve disorders.³² Lead also has acute and chronic effects on plants, animals, and microorganisms.³³ CRT glass is composed of about 20 percent lead; consequently, the CRT in an average computer screen contains between four and eight pounds of lead.³⁴ Therefore, the CRTs that will become

obsolete in Washington State between 2003 and 2010³⁵ will alone release approximately twenty-one million pounds of lead into the e-waste stream.³⁶

Mercury is another toxic and dangerous constituent of e-waste.³⁷ An estimated 22 percent of the world's annual use of mercury is utilized in manufacturing electronic devices, such as thermostats, sensors, relays, switches, cell phones, batteries, and flat panel monitors.³⁸ Poisonous methylmercury forms when the inorganic mercury located in electronics comes into contact with water.³⁹ This methylmercury is particularly hazardous to children and fetuses because it can affect their thinking, memory, language, fine motor skills, and kidneys.⁴⁰ Methylmercury also accumulates in other living organisms, such as fish, and it becomes more concentrated as it travels up the food chain through predatory consumption.⁴¹

Cadmium, a heavy metal used in computer batteries, circuit boards, semiconductor chips, and CRTs,⁴² is extremely toxic, even in low concentrations.⁴³ Inhalation of cadmium dust causes respiratory tract and kidney problems; ingestion of cadmium causes immediate poisoning as well as liver and kidney damage.⁴⁴ Additionally, many cadmium-containing compounds are carcinogenic.⁴⁵

Hexavalent chromium, which is used for corrosion protection and as a hardener of steel housings, is another toxic component of e-waste.⁴⁶ If ingested or inhaled, hexavalent chromium compounds are highly toxic.⁴⁷ They not only irritate the eyes, skin, and mucous membranes, but also are established carcinogens and can damage DNA.⁴⁸ A mere half teaspoonful of hexavalent chromium is lethal.⁴⁹

Beryllium, barium, nickel, and even toner from improperly disposed printer cartridges are additional hazardous elements of the e-waste stream. Beryllium is a lightweight, hard conductor of heat and electricity used in many electronic appliances, including motherboards.⁵⁰ Exposure to beryllium can result in berylliosis, a pulmonary and systemic disease, while beryllium and its compounds are also potentially carcinogenic.⁵¹ Short-term

exposure to barium—commonly found in CRTs—may cause brain swelling; muscle weakness; and heart, liver, and spleen damage.⁵² In addition, animal studies have shown that ingestion of barium over a period of time may lead to increased blood pressure and changes in the heart.⁵³ Nickel sulfide fumes and dust are believed to be carcinogenic,⁵⁴ while inhalation of black toners used in printer cartridges may lead to respiratory tract irritation; these toners are also possible human carcinogens.⁵⁵

Finally, brominated flame retardants (BFRs)—used in printed circuit boards, cables, and plastic computer casings—are neurological and developmental reproductive toxicants and are believed to be endocrine disruptors, which can negatively affect the function of thyroid hormones.⁵⁶ The incineration of BFRs and polyvinyl chloride (PVC)—which coats copper cables and computer casings⁵⁷ and makes up 13.8 pounds of an average computer⁵⁸—releases toxic and carcinogenic⁵⁹ dioxins and furans into the atmosphere.⁶⁰ This makes incinerating e-waste particularly dangerous because copper, a common constituent in many electronic parts, catalyzes the formation of dioxins.⁶¹

B. Why is E-waste Exported?

This section describes how global economics and the digital divide encourage the export of hazardous e-waste to poor, developing countries that are far less able to manage the environmental effects of e-waste.

1. Global Economics

I think the economic logic behind dumping a load of toxic waste in the lowest wage country is impeccable and we should face up to that . . . I've always thought that under-populated countries in Africa are vastly under-polluted.

*Larry Summers, Chief Economist at the World Bank, 1991*⁶²

The export of toxic e-waste from rich, developed countries to poor, developing countries is a consequence of global economic forces⁶³ because hazardous wastes generally follow the path of least resistance—that of lower costs and lower standards.⁶⁴ The economic incentives created by strict domestic processing and environmental regulation, lax or nonexistent regulations in developing countries, and the ease of free trade brought about by globalization, force even well-intentioned recyclers to export e-waste.⁶⁵

The e-waste stream is unlike other hazardous waste streams because its valuable components and capacity to be reused or recycled can potentially provide economic incentives for efficient waste management.⁶⁶ It is estimated that 50 percent of computers turned in for recycling are in good working order⁶⁷ and, therefore, have potential value to other users. Further, many components from nonworking electronics could simply be transferred to new machines⁶⁸ or recycled for their valuable raw materials.⁶⁹ However, much of the potential for reusing e-waste is not realized because electronics are designed for disposal rather than recycling, making them expensive and difficult to disassemble or upgrade.⁷⁰ In addition, as manufacturers work to cut escalating production costs, the precious metal content in electronic products is reduced,⁷¹ further reducing the economic incentive to recycle electronics domestically. Therefore, without regulations making private actors internalize the negative externalities of e-waste, potential incentives for domestic reuse and recycling are not strong enough to overcome the greater economic pressures to export.⁷²

One of the main triggers of e-waste exports arises from the rational self-interest of keeping toxic metals out of local landfills and the domestic environment.⁷³ Because of heightened environmental concern, many states have banned e-waste from landfills or have adopted strict e-waste regulations;⁷⁴ in response, domestic recycling and disposal costs of hazardous products have skyrocketed.⁷⁵ Therefore, most recyclers remove the few parts that can be sold domestically⁷⁶ and then sell the remaining e-waste to brokers who ship it to developing countries such as China.⁷⁷

At the same time, developing countries have a weak capacity for regulation, with occupational and environmental protections that are either poorly enforced or nonexistent.⁷⁸ Therefore, the costs of handling e-waste are automatically lower than in developed countries, and this cost differential is compounded by the cheap labor in developing countries.⁷⁹ It is estimated that shipping e-waste to China is ten times cheaper than handling the waste in the United States.⁸⁰ As a result, recycling operations that may not be profitable in developed countries are feasible in developing countries, and there are many entrepreneurs prepared to buy e-waste.⁸¹ This leaves developing countries with an untenable choice between poverty or poison.⁸²

In addition, the free trade agenda set by developed nations⁸³ provides the channel through which e-waste can be exported to developing countries. The expansion of global trade networks has lowered transportation and communication costs, making the export of e-waste even more financially attractive.⁸⁴ Moreover, although it is illegal for most other developed countries to export toxic waste to developing countries, the United States has not ratified the Basel Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal or its Basel Ban Amendment.⁸⁵ Consequently, there are no treaties or other legal barriers preventing the e-waste exports to developing countries.

2. The Digital Divide

Another factor that encourages the trade of e-waste is the growing demand for technology in developing countries, which is fueled by a hunger to compete on a global level and to apply unique technology to bridge significant gaps in developing economies.⁸⁶

People in developing countries are fully aware of the importance of computer literacy and the need to stay abreast of technological developments in order to communicate and compete in the increasingly globalized world.⁸⁷ However, most citizens of developing countries can

simply not afford new technology, and so they are desperate for affordable, albeit used, electronic equipment.⁸⁸

In addition, technology has allowed developing countries to address endemic problems unique to their economies, such as improving inadequate infrastructure and monitoring the treatment of HIV/AIDS.⁸⁹ For example, the Grameen Foundation's Village Phone program facilitates rural entrepreneurship in developing countries by providing both a source of income to individuals and vital telecommunications services to communities.⁹⁰ Cellular phones have been used to provide banking services to rural and low-income communities that previously had difficulty accessing banks.⁹¹ Similarly, Cell-Life, a South African nonprofit organization, uses cellular phone technology to overcome infrastructural and logistical hurdles in monitoring the antiretroviral treatment of HIV/AIDS victims in African countries.⁹²

This demand for technology prompts many brokers in developing countries to pay for obsolete electronics that can be repaired, refurbished, or used as-is.⁹³ Unfortunately, in the absence of sound policy and strict export regulations in the United States, disparities in knowledge and wealth make developing countries dumping grounds for e-waste that is exported under the guise of reuse and recycling.

C. Social Justice Implications: What Happens to Exported E-waste?

Environmental degradation is the degradation of the quality of life.⁹⁴ Exporting toxic e-waste is unfair because rather than the manufacturers, producers, and users bearing the true costs of their products, developing countries are forced to bear the environmental and health costs of toxic e-waste in exchange for desperately needed jobs, income, and foreign currency.⁹⁵ This impedes economic growth and disproportionately burdens the poor; it is fundamentally unjust.

E-waste trade is not a positive trade based on competitive advantage; rather it is an unjust exploitation of developing countries' weak capacity for

environmental and occupational regulation. Developing countries are far less equipped to effectively manage e-waste hazards in ways that protect human health and the environment than the countries that generate the waste.⁹⁶ In fact, most developing countries have little or no control over disposal of hazardous wastes.⁹⁷ Furthermore, many people working with e-waste have minimal education or are illiterate and lack basic knowledge of the dangers they are exposed to on a daily basis.⁹⁸

The e-waste trade compromises the economic potential of developing countries, making it even more difficult for them to overcome their development hurdles. The toxic waste contaminates the soil, the groundwater, and the food-chain,⁹⁹ which is especially harmful to these countries' subsistence farmers and agrarian economies.¹⁰⁰ In addition, the opportunity costs of resources redirected from education or infrastructure building to deal with ill-health that is caused by polluted water and food sources are significant. High percentages of children die before the age of five if water is not safe to drink and nutritious and affordable food is not available;¹⁰¹ thus, future generations that could be educated to build the economies of these countries are jeopardized. Moreover, unhealthy populations create weaker work forces, which are less able to contribute to growing the economies.

Furthermore, the continued e-waste trade seems to contradict the United Nations' impressive Millennium Development Goals of eradicating poverty, improving health and mortality rates, and ensuring environmental sustainability;¹⁰² this raises a question about the level of commitment to these goals.

This section further illustrates the injustice of e-waste exports by describing the deleterious effects of e-waste sent to China for "recycling" and to Nigeria for "reuse." Although specific conditions in these two countries are discussed, the horrors of "recycling" and "reuse" exports are by no means limited to these countries.¹⁰³

1. “Recycling” in China

Although most Americans believe they are helping the earth when they “recycle” their old electronics,¹⁰⁴ few realize that exporting disguised as “environmental stewardship” is often just as harmful as outright disposal of toxic wastes in developing countries.¹⁰⁵ “Recycling” in the developing countries of Asia often involves open burning, acid baths, and dumping of toxic wastes into the rice paddies, irrigation canals, and water supplies of some of the world’s poorest populations.¹⁰⁶ Thus, instead of electronics manufacturers, western consumers, and waste brokers who benefit from the electronics trade bearing the full health and economic costs,¹⁰⁷ “recycling” serves as a “green cloak” for exporting waste. The export of this waste to those least able to handle the problems is a direct affront on the principles of environmental justice.¹⁰⁸

Although recycling of hazardous waste anywhere in the world poses a serious pollution challenge, it can be disastrous in areas where there is simply no infrastructure to deal with the hazards and waste.¹⁰⁹ There are no precise figures, but experts estimate that 50 to 80 percent of the three hundred thousand to four hundred thousand tons of electronics collected annually for recycling in the United States ends up in foreign countries.¹¹⁰ In the first nine months of 2007, Hong Kong authorities intercepted eighty-five containers of electronic junk and returned them to their countries of origin; twenty of these came from the United States.¹¹¹ Unfortunately, many shipments are not intercepted, and they end up in primitive “recycling” programs, where, for as little as \$1.50 per day,¹¹² men, women, and children use hammers, chisels, and their bare hands to remove valued materials at great cost to their health and the environment.¹¹³

For instance, a Basel Action Network¹¹⁴ and Greenpeace investigation revealed horrific conditions in the town and vicinity of Guiyu, a once rural, rice-growing community in the Chaozhou region of China’s Guangdong Province.¹¹⁵ Within five years of this rural community becoming an e-waste processing center, groundwater pollution became so bad that water for the

entire community now needs to be trucked in from a town about nineteen miles away.¹¹⁶ Even so, local contaminated surface water is still used for drinking, cooking, and washing.¹¹⁷ Sediment samples revealed chromium levels 1,338 times the EPA-recommended threshold level and barium levels ten times the EPA threshold.¹¹⁸ Workers with neither protective clothing nor respiratory equipment routinely inhale toner, fumes from circuit-board desoldering, and acid gases from chip stripping.¹¹⁹ Children play among ash heaps where wires and PVC have been openly burned.¹²⁰ Ancient irrigation canals along former rice paddies are filled with broken, lead-laden CRT glass and unrecycled plastic.¹²¹

It is hard to accept that recycling of this nature—which results in toxic worker exposure, open burning, and dumping—is a better option than landfilling the waste in the United States. Ironically, efforts to export the problems of toxic e-waste have not only caused severe harm and damage in developing countries, they have now come back to haunt us. In 2007, Americans were shocked by the nearly twenty million toys that were recalled for safety reasons due to their lead content.¹²² However, there is specific evidence that lead found in products imported into the United States for sale at Claire's and Kmart stores, such as cheap children's jewelry and keychains, actually has its source in the electronic waste shipped to China for "recycling."¹²³ Therefore, something needs to be done about the current state of e-waste exports for "recycling" in developing countries, even if for no other reason than to prevent e-waste toxins from returning to the United States in our children's products.

2. "Reuse" in Africa

What Africa needs is clean jobs. Africans want to live like other human beings, they want to enjoy life. [E-waste dumping] is shortening their lives. . . . If somebody know[s] that something is bad, and you give this to somebody who is poor, you are terrorizing him. I call this toxic terrorism . . . because it's only beneficial to one side.¹²⁴

Reuse is usually preferable to recycling and disposal¹²⁵ because it extends product life and bridges the digital divide by making technology available to those who may otherwise not have access to it. However, reuse has increasingly become a pretext for exporting hazardous waste to developing countries where it is either dumped or openly burned, producing severe health and environmental effects.¹²⁶

An estimated five hundred containers, each holding approximately eight hundred computers or monitors, arrive in Lagos, Nigeria, every month, purportedly for reuse.¹²⁷ Approximately 75 percent of the imported equipment, some three hundred thousand computers, is unusable “junk.”¹²⁸ Although the modern, functioning, or repairable products fill a huge need and move rapidly into repair shops and then onto the street markets,¹²⁹ most of the useless e-waste ends up in formal or informal dumpsites, all of which are unlined, unmonitored, close to the groundwater, and routinely set on fire.¹³⁰ A Basel Action Network investigation observed children, scavengers, and goats roaming over swampy waysides between shops and apartments filled with informal dump-and-burn sites.¹³¹ Many of the scavengers were children and teenagers looking for copper scraps they could sell, but none were aware of the health and environmental hazards over which they were crawling.¹³²

In addition, even the products that can be repaired or refurbished often require the hazardous parts or components to be replaced, and these unusable parts are immediately disposed of along with all the “junk” that arrives.¹³³ Thus, there is no difference between useless components that are exported as part of a product to be refurbished for reuse, and useless components that are exported simply for the purpose of dumping: both end up being dumped.

II. E-CYCLE WASHINGTON: WASHINGTON'S ELECTRONIC PRODUCT RECYCLING PROGRAM

The Washington State legislature has recognized that the millions of unwanted electronic products disposed of in the state each year create a toxic and serious waste problem.¹³⁴ As a result, Washington is one of the first states to adopt a comprehensive Extended Producer Responsibility (EPR) approach, imposing end-of-life responsibility¹³⁵ on manufacturers rather than on the consumers or the government.¹³⁶ EPR makes manufacturers internalize the environmental and health costs of the products they produce and, accordingly, uses market forces to incentivize less toxic and more recyclable product designs.¹³⁷

This section describes the E-Cycle Washington Program (Program or E-Cycle Program)¹³⁸ developed by the Washington Department of Ecology that was implemented on January 1, 2009.¹³⁹ Products covered by the Program (covered electronic products) include any desktop and laptop computers and monitors and televisions with “viewable area[s] greater than four inches when measured diagonally” that have been used in Washington State.¹⁴⁰ The Program requires labeling of covered electronic products, annual registration and fees payable by manufacturers, and a plan for the collection, transport, and processing of unwanted electronic products, which is financed by manufacturers.

The Program employs EPR because it imposes end-of-life responsibility¹⁴¹ on electronic product manufacturers conducting commerce in the state. In order for covered electronic products to be offered for sale or sold in or into Washington State, the manufacturers are required to register their company names and their brand names with the Department of Ecology on an annual basis.¹⁴² Manufacturers that have never offered for sale or sold covered electronic products in or into Washington may also be required to register if the Department of Ecology determines that their covered electronic products are being returned in Washington for collection or recycling.¹⁴³ Covered electronic products sold in or into Washington

State are required to be labeled with the manufacturer's registered brand name.¹⁴⁴ Manufacturers are also required to pay the Department of Ecology an annual administrative fee, which is calculated on a sliding scale based on their Washington market shares and/or annual sales in the state.¹⁴⁵ Manufacturer violations and penalties for the registration and labeling requirements are set out in the Washington Administrative Code.¹⁴⁶

As of January 1, 2009, all manufacturers¹⁴⁷ that make sales in or into Washington State must also implement and finance a fully operational plan for the collection, transportation, processing, and recycling (CTPR) of unwanted covered electronic products from "covered entities."¹⁴⁸ A covered entity is any household, charity, school district, small business, or small government located in Washington.¹⁴⁹ The CTPR services must be provided at no additional cost to consumers and must be established in both urban and rural areas in each county of the state.¹⁵⁰

Manufacturers' plans for the CTPR of covered electronic products from covered entities (plans or CTPR plans) may be administrated by the quasi-governmental Washington Materials Management and Financing Authority¹⁵¹ (WMMFA Standard Plan¹⁵²) or an authorized party (independent plan¹⁵³).¹⁵⁴ All plans must include detailed information, including the names and locations of the entities that are contracted for the CTPR of covered electronic products.¹⁵⁵ These contracted CTPR entities must be fairly compensated by manufacturers for their services.¹⁵⁶ The CTPR plans are also required to include a description of how the manufacturers will work with the direct processors¹⁵⁷ (entities contracted to the CTPR plans for processing of covered electronic products) "to promote and encourage the design of electronic products that are less toxic and contain components that are more recyclable."¹⁵⁸ Plans must be updated every five years.¹⁵⁹ Washington Materials Management and Financing Authority (Authority) or authorized party violations of the plan requirements and penalties are set out in the Washington Administrative Code.¹⁶⁰

Plans must make the collection of unwanted covered electronic products reasonably convenient in rural and urban areas throughout the state.¹⁶¹ The Authority or authorized party may contract with collectors that must register annually with the Department of Ecology¹⁶² and must comply with prescribed performance standards set forth in the Washington Administrative Code.¹⁶³ Collection services provided by these collectors must be free to consumers, unless additional services, such as curbside collection, are involved.¹⁶⁴

Transporters that transfer covered electronic products from collection sites to processors or recyclers,¹⁶⁵ must also register annually with the Department of Ecology and meet prescribed performance standards as set forth in the Washington Administrative Code.¹⁶⁶ Transporters may only deliver electronic products to registered direct processors.¹⁶⁷

Direct processors used by the plans are also subject to Program requirements¹⁶⁸ and must register annually with the Department of Ecology and meet the minimum or preferred performance standards.¹⁶⁹ Minimum performance standards are required of all direct processors involved in handling covered electronic products as part of a Department of Ecology approved plan, whereas preferred standards are voluntary.¹⁷⁰ Direct processors must undergo an annual external compliance audit to ensure that they are meeting minimum performance standards.¹⁷¹

The minimum performance standards require that a direct processor “must take all practicable steps to maximize recycling.”¹⁷² Prior to recycling, the direct processor must remove all materials that “pose a risk to worker safety, public health, or the environment during subsequent processing.”¹⁷³ Information about how and where products will be recycled must be available to the public via the collectors.¹⁷⁴ To encourage reuse, plans that use the collections services of nonprofit reuse organizations get a credit of 5 percent toward meeting their annual equivalent share¹⁷⁵ for the pounds of covered products received by these organizations for recycling.¹⁷⁶ The minimum performance standards in place at the Program’s launch

required that if an electronic product, component, or part is to be reused it must be fully functioning.¹⁷⁷ However, in response to concerns that this would limit refurbishment for reuse and despite opposing concerns that this may create a loophole for unscrupulous dumping of e-waste, the 2009 state legislature is likely to amend the regulations to allow collectors to refurbish products part-for-part on-site.¹⁷⁸ If a direct processor exports, the minimum performance standards require that it comply with transit and recipient countries' laws and local requirements relating to the processing, handling, disposal, and transboundary movement of electronic products and components.¹⁷⁹

The voluntary preferred performance standards encourage recycling further by requiring that the direct processor separate components and materials to be recycled so as "to generate value, recover materials and minimize waste, and to enable safe management through final disposition."¹⁸⁰ The preferred performance standards also go further in ensuring legitimate reuse by requiring that direct processors test the covered electronic products to make certain that they are functioning properly for their intended purposes. If products are going to be reused, the preferred performance standards require processors to label and package them to minimize damage during transport.¹⁸¹ Under the preferred performance standards, direct processors are expected to verify a legitimate end-use market for products that are shipped for reuse.¹⁸² The preferred performance standards also impose export obligations beyond the minimum performance standards by requiring that if a direct processor exports "materials of concern,"¹⁸³ it ensures that each transit and recipient country legally accepts such imports.¹⁸⁴ In addition, the preferred performance standards require that if these recipient countries are not members of the Organization for Economic Co-operation and Development (OECD), the direct processor must obtain clear consent and documentation that the country legally accepts imports, either from a competent authority of that country or from the Environmental Protection Agency (EPA).¹⁸⁵

In addition to covering manufacturers, the Program imposes requirements on retailers that offer for sale or sell covered electronic products in or into Washington State.¹⁸⁶ Retailers are required to ensure that, on the date a product is ordered, its brand name is on the Department of Ecology's "manufacturer registration list" and the product is in compliance with the registration, labeling, and recycling plan requirements.¹⁸⁷

III. WEAKNESSES OF WASHINGTON STATE'S ELECTRONIC PRODUCT RECYCLING PROGRAM AND PROPOSALS FOR CHANGE NEEDED TO PREVENT E-WASTE DUMPING IN DEVELOPING COUNTRIES

The purpose of Washington's Electronic Product Recycling Program is to reduce the amounts and types of toxic materials from e-waste that end up in solid waste landfills¹⁸⁸ by using the EPR model of imposing end-of-life responsibility¹⁸⁹ on the manufacturers of electronic products.¹⁹⁰ To this end, the Program is a ground-breaking step in the right direction. The Program's early success was evidenced by a collection of over three million pounds of e-waste in its first month of operation—20 to 30 percent more than expected.¹⁹¹ In addition, the Washington Materials Management and Financing Authority (Authority), which is administering the Standard Plan for the CTPR of electronics, adopted the voluntary preferred performance standards for processors in 2009.¹⁹² Further, as of February 2008, when all plans for the 2009 year had to be submitted to the Washington State Department of Ecology, no independent plans had been arranged.¹⁹³ Thus, at least for the first year of the Program, processors will be held to the more stringent preferred processing standards.

Nonetheless, in future years, the minimum standards may be used either by the Authority or independent plans. In addition, because the dynamic toxic waste problem tends to find its way to the next loophole,¹⁹⁴ even the preferred standards of the Program may not be effective in preventing further plunder of developing nations with e-waste.

This section explores potential weaknesses of Washington's E-Cycle Program and sets forth proposals to strengthen the Program, including broadening the scope of covered electronic products, increasing manufacturer responsibility, emphasizing reuse, and improving the public awareness program. However, because of the state's inability to ban exports of toxic waste,¹⁹⁵ even the best state program will be limited in its effectiveness. Therefore, this section concludes by describing the change Washington residents and state representatives need to push for on a federal level to prohibit the export of e-waste to developing nations.

A. Broaden the Covered Electronics Definition

The first weakness of the Program is that the definition of the covered electronic products¹⁹⁶ included in the Program is too limited. As a result, only manufacturers of computers and televisions will be held responsible for their products and motivated to reduce levels of toxicity, and many other electronics, such as printers, cellular phones, fax machines, and household appliances are not subject to regulation. Unless the definition of e-waste is broadened, these toxic electronic products will continue to either poison our own environment because they end up in domestic landfills or incinerators, or poison the developing countries where they are sent under the pretext of recycling or reuse.

Furthermore, there is industry support for expanding the scope of state legislation covering e-waste because without it, manufacturers of certain products are forced to internalize costs while manufacturers of other products do not have to bear the true costs of the products they produce. For example, in a letter to the chair of the New Jersey Senate Budget and Appropriations Committee—a month prior to New Jersey passing its e-waste bill in January 2008¹⁹⁷—a senior executive of Sony Electronics Inc. requested that the New Jersey Senate consider “adopting one program with one set of requirements that requires producer responsibility for all products manufactured by each company.”¹⁹⁸

The European Union's Waste Electrical and Electronic Equipment (WEEE) Directive should be used as a model for a broader definition of covered electronic products. The WEEE Directive contains ten categories of equipment: (1) large household appliances; (2) small household appliances; (3) information technology and telecommunications equipment; (4) consumer equipment; (5) lighting equipment; (6) electrical and electronic tools; (7) toys, leisure, and sports equipment; (8) medical devices; (9) monitoring and control instruments; and (10) automatic dispensers.¹⁹⁹

In addition, the definition of electronic products should be expanded to include future generations of electronics so that environmental impact is taken into account during the initial design of these products. Otherwise, the Program will quickly lose its effectiveness, and it will provide an incentive for producers to design goods that fall outside the definition of covered electronic products.

B. Increase Manufacturer Responsibility

E-waste, unlike other forms of toxic waste, is designed waste;²⁰⁰ thus, manufacturers have the greatest ability to prevent downstream and end-of-life problems of their electronic products. For example, manufacturers can alter designs to make products easier to disassemble, and they can replace toxic components with more environmentally friendly and recyclable components. This unique characteristic means that forcing manufacturers to internalize the costs associated with their products' reuse, recycling, safe handling, and disposal will ultimately encourage improved designs that are less toxic and more recyclable. This is especially important in light of the rapid rate of technological developments, which fuel obsolescence and a growing e-waste stream. Although the Program does include manufacturer responsibility, it could be greatly strengthened by increasing the level of manufacturer responsibility.

Manufacturer responsibility creates incentives for manufacturers to reallocate the costs of compliance to their suppliers, distributors, and retail

chains; as a result, entities that are not the direct focus of regulations will also ultimately bear the costs and design innovation will be incentivized throughout the supply chain.²⁰¹ Although costs may be passed onto consumers through the increased price of electronics, this will reduce rapid obsolescence because with higher prices, consumers will be less willing or able to afford upgrades as often. Lower demand will not only curb the waste stream, but it will also incentivize manufacturers to keep prices low to encourage consumer spending. To lower prices, manufacturers will have to come up with products that are cheaper to handle at the end-of-life, such as products that are more recyclable or nontoxic products that are not subject to regulation.

Moreover, increased manufacturer responsibility is not as likely to come up against as many acceptance hurdles as some may anticipate. Many manufacturers have already shown concern about environmental stewardship, and many are willing to take on more responsibility for their products simply because they do not want to be seen as contributing to the problems of e-waste dumping that have been exposed.²⁰² Several large electronics producers, including Dell, Hewlett-Packard, Apple, and Sony, already take back their products from consumers at no charge.²⁰³ Although manufacturers such as Hewlett-Packard and IBM have their own recycling facilities, other manufacturers contract with recycling companies to handle the e-waste.²⁰⁴ For example, in 2008, Sony Electronics Inc., together with Waste Management, Inc., established a nationwide take-back and recycling program with over one hundred and fifty outlets.²⁰⁵ Sony Electronics Inc. has also stated that it supports internalizing recycling costs and that it is the company's "ultimate goal through design improvements, the growth of the recycling industry, and efficiency of scale is to drive . . . recycling costs down."²⁰⁶ Thus, manufacturers certainly have the means and capability to take responsibility for their end-of-life electronic products. A similar willingness to participate in responsible recycling has come from the retail

industry with various take-back initiatives established by eBay, Best Buy, and Office Depot.²⁰⁷

Although it has been argued that electronics companies should, and can, slow the rate of obsolescence by designing products for durability and upgradeability,²⁰⁸ this is an unrealistic expectation because the greatest reason for rapid obsolescence is rapid innovation. Producers presumably design their top-of-the-range electronics with the most up-to-date technology available at the time. Thus, requiring electronics companies to design their products to sustain future developments in hardware and software is akin to expecting them to foresee future innovation.

Nonetheless, increased manufacturer responsibility can be imposed, and incentives can be created, in three ways: (1) by imposing limits on the use of hazardous substances used in electronic products; (2) by making manufacturers share responsibility with large corporations and government (which are not covered entities under Washington's E-Cycle Program) to provide safe end-of-life handling; and (3) by making manufacturers, rather than processors, responsible for toxic components all the way through final disposition.

1. Impose Limits on Hazardous Substances

The E-Cycle Program relies on the extra costs of registration and implementation of the collection, transportation, and processing plans to motivate cleaner designs of electronic products.²⁰⁹ Instead of relying only on economic incentives to promote greener design, stronger incentives for manufacturers to design more recyclable and less toxic products could be created by placing limits and phase-out dates on certain hazardous substances in products, as the European Union (EU) and California have done.

The EU Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) requires hazardous materials such as lead, mercury, cadmium, hexavalent chromium,

and BFRs to be phased out of production.²¹⁰ In addition, the EU RoHS Directive does not only apply to European companies; it also requires that manufacturers located outside of Europe that export products to European countries comply with the regulations.²¹¹ Therefore, manufacturers located in the United States and other countries are already required to reduce the levels of toxic components in their products if they export them to Europe. Hewlett-Packard is one such domestic company that has started designing products with fewer toxic materials.²¹² In Japan, electronics companies, including Sony and Panasonic, have started to reduce and eliminate the use of lead in the design and manufacture of their products.²¹³ Furthermore, a number of large electronic manufacturers in the United States have said that they would support domestic requirements to meet the RoHS Directive's standards.²¹⁴

When California adopted its Electronic Waste Recycling Act (EWRA), it followed the EU's example and required manufacturers to report on their efforts for designing greener products and reducing hazardous materials in electronic products.²¹⁵ The EWRA requires manufacturers to follow the EU's RoHS Directive requirements of elimination of lead, mercury, cadmium, and other toxins.²¹⁶ Although there have been no legal challenges to this EWRA requirement, there have been concerns raised about the constitutionality of a state law's reference and reliance on the RoHS Directive which is periodically revised and updated by the European legislature.²¹⁷ Therefore, rather than requiring compliance by a direct reference to the RoHS Directive, the Washington state legislature could prohibit the sale of covered electronic products that are illegal in the EU. This would not be a burdensome requirement because if RoHS-compliant products are available in California and Europe, there is no reason why they cannot be made available in Washington State.

2. Large Corporations and Government

The covered entities definition of the Program is too narrow. The definition of covered entities includes only households, charities, school districts, small businesses,²¹⁸ and small government.²¹⁹ This is presumably because Washington State has Dangerous Waste Regulations²²⁰ that apply to entities that produce over two hundred twenty pounds of hazardous solid waste per month (large entities)—mostly large businesses and government.²²¹ These state regulations implement the federal Resource Conservation and Recovery Act (RCRA),²²² which is deficient in the e-waste context because its narrow definition of solid hazardous waste does not apply to a large portion of the e-waste stream, it has inadequate export provisions, and it creates the wrong incentives.

RCRA not only excludes households and small businesses from regulation,²²³ but it also creates a loophole for e-waste from large entities because used equipment donated for educational or charitable reuse is exempt from regulation.²²⁴ This creates incentives to donate used equipment for reuse, but it also shifts the externalities away from the manufacturers and larger users who are best able to cover the true costs of the products they produce and enjoy.

Furthermore, even if waste contains materials that are classified as toxic, the waste will only be classified as hazardous under RCRA if it leaches these chemicals at concentrations deemed dangerous to public health.²²⁵ This definition is ineffective because repeated testing is needed to determine leachate toxicity, and while the e-waste stream is changing at the rapid pace of technological innovation, it takes the EPA (which enforces RCRA) a relatively long time to declare a particular type of e-waste hazardous.²²⁶ Moreover, this classification fails to take into account the cumulative effect of the ever-growing e-waste stream.

RCRA's strict regulations for disposal within the United States create a strong incentive to export wastes beyond its regulatory reach.²²⁷ RCRA does not ban exportation, but merely requires prior notification of shipment

and consent from the receiving nation.²²⁸ However, there is a loophole because wastes destined for recycling operations (rather than disposal) are exempt from the limited notification and consent requirements.²²⁹ Therefore, once the recycling exemption has been claimed, the EPA has no authority to determine whether those exports will be actually recycled or merely dumped.²³⁰ As described in Section I, crude recycling in developing countries—that results in toxic worker exposure, open burning, and dumping—arguably causes more ecological and societal damage than landfilling the e-waste in the United States would.

Finally, RCRA is inadequate because it focuses on regulating the behavior of end-users who generate the waste, rather than on regulating manufacturers directly.²³¹ Therefore, although the Washington Electronic Product Recycling Program imposes manufacturer responsibility for end-of-life handling of products disposed of by covered entities (small businesses and government), there is no manufacturer responsibility for products disposed of by large corporations and large government, which must provide and pay for their own e-waste recycling.²³²

The cost of safe recycling of unwanted electronics and the deficiencies of RCRA create incentives for these large entities to dispose of or export their unwanted electronic products irresponsibly. In fact, it is estimated that about 75 percent of electronic products received by recyclers come from these large-scale users;²³³ thus, in the Seattle metropolitan area, where several large high-tech corporations are based, there is a huge volume of electronic products generated for which manufacturers bear no end-of-life costs. To some extent nongovernmental organizations and the media will keep these large entities in check. However, this informal oversight is not foolproof, and it is also an overlooked opportunity for creating the green-design incentives by imposing manufacturer responsibility.

Therefore, the E-Cycle Program should be amended to include large businesses and large government and hold these entities to higher recycling and reuse standards than the RCRA regulations that already apply to them

(via the state Hazardous Waste Regulations). One way in which EPR could be introduced for these large entities would be to require manufacturers to work collaboratively with these large businesses and government to ensure safe handling of these entities' electronic products. This collaboration could be achieved either by making manufacturers and large entities jointly financially responsible for existing safe handling and recycling programs implemented by the entities or by requiring large entities to share the cost of manufacturers' plans under the existing Program with respect to their share of the waste. The latter option is feasible because the E-Cycle Program already has a method in place for determining manufacturers' equivalent share,²³⁴ and this could be modified to calculate large entities' equivalent shares. Either way, the joint responsibility of manufacturers and large entities will create a self-regulation with minimal government intervention or monitoring by creating an economic incentive for the parties to keep each other in check.

3. Downstream Responsibility

Although the voluntary preferred standards require direct processors to maintain records of the chain of custody of "materials of concern"—such as mercury, CRTs, leaded glass, and circuit boards—through to final disposition,²³⁵ records are not required in the minimum performance standards. Thus, under the minimum standards, there are no measures to record what happens to the dangerous components or to ensure that they are handled properly beyond the first processor. Because the Authority has adopted the preferred performance standards for 2009,²³⁶ this does not pose an immediate practical problem; however, the minimum performance standards²³⁷ are still deficient should the Authority or future independent plans decide to use them. In addition, because processors do not affect the design or composition of the electronic products, the preferred standards would be more effective if the responsibility to monitor and track materials of concern was placed directly on the manufacturers.

Therefore, one means of strengthening both the voluntary and minimum standards would be to require manufacturers to keep statistics of their products that are reused and recycled and to track the volume of materials of concern as they move beyond the first processor. This information should be available to the public so that the public can make informed purchasing decisions.

C. Emphasize Reuse

The E-Cycle Program also fails to provide enough emphasis on reuse. Reuse is ecologically preferable to recycling or disposal because it prolongs the life of a product; however, reuse can also achieve other social benefits by providing technology to users who would otherwise not have access to it. As discussed in Section I, there is a massive digital divide between developing and developed countries, and in order for developing countries' economies to grow, the people need access to technology. Thus, increased emphasis in the Program on reuse of electronics would be a step towards narrowing this digital divide.

It has been asserted that reuse is a less preferable waste management option for technology that undergoes rapid obsolescence, such as computers.²³⁸ However, even though the products may not be the most up to date and there may not be a domestic market for them, reuse will at least enable people in developing countries access to technology and the opportunity to develop the computer skills that are vital to being globally competitive. Also, the social programs for overcoming infrastructural problems described in Section I only require functioning technology, not state-of-the-art technology.

Even though approximately 50 percent of computers turned in for recycling are in good working order,²³⁹ only a very small percentage of discarded computers are reused, and many reusable products remain in storage.²⁴⁰ In addition, even if it is not economical to refurbish or repair products domestically for reuse, developing countries have the cheap and

able labor forces that can repair products at costs low enough to resell them for a profit.²⁴¹ For instance, the Basel Action Network investigation revealed that Nigeria has many highly skilled workers who are willing and able to repair and refurbish used electronics for reuse.²⁴²

Therefore, the vague obligation the Program imposes on e-waste processors to ensure that goods for reuse are functional is an unsatisfactory measure to ensure that usable goods are reused and unusable goods are not dumped under the guise of reuse. The likely 2009 amendment to the regulations will allow collectors to repair and refurbish products for reuse.²⁴³ This will significantly improve the Program's ability to promote reuse, but to further encourage reuse, the Program should require that on collection, before processing, all products are tested to determine if they are actually reusable. Testing requirements will not be difficult to implement because the voluntary preferred standards already require testing and labeling of goods designated for reuse, as well as verification that there is a legitimate end market for reuse.²⁴⁴ In addition, Australia has successfully implemented a testing and labeling scheme, which could be used as a guideline for this part of the Program.²⁴⁵

Such testing requirements could serve to divide the e-waste stream into those products that are functional or that can be repaired or refurbished and those products that cannot be repaired and must be recycled or disposed of. The Program should then mandate that only products that cannot be repaired and reused should be recycled or disposed of.²⁴⁶ At the testing point, all products should be labeled and designated into either stream. In addition, if a product is repairable but needs to have hazardous components replaced, these components should be removed from the product and separated into the recycling and disposal stream before the repairable product is included in the reuse stream. This separation will ensure that those products that need to be repaired or refurbished will not create an immediate need in developing countries for the disposal of nonworking hazardous components.

D. Consumer Education and Public Awareness

Although there has been a promising initial response to the E-Cycle Washington Program,²⁴⁷ the public awareness campaign should be strengthened.

Consumer awareness is crucial to the success of the Program because in order for the public to meaningfully participate, they need to be aware of the toxicity and dangers posed by simply discarding electronic waste in their trash and of the impact exported e-waste has on poor nations. Even if concern for the environment and people in other countries is not enough to motivate public activism, the threat of lead and toxic components returning to the United States in children's jewelry and toys surely is. Additionally, public awareness will create consumer pressure on manufacturers to improve product design. If consumers are aware of the dangers in standard electronic products, they will begin to purchase those products that have reduced or eliminated toxicity. Although financial responsibility for toxic products will create incentives for greener design, ultimately changes in consumer demand will have a greater effect in achieving the legislature's goal of creating nontoxic and more recyclable electronic products.

The E-Cycle Program has a website and a brochure that provides consumers with information about the Program and the toxicity of e-waste, as well as a toll-free number (1-800-RECYCLE), which provides consumers information about where to locate recycling services in their areas.²⁴⁸ Although there has been national news exposure on the dangers of uncontrolled e-waste exports,²⁴⁹ the E-Cycle informational materials could be strengthened by including similar information for Washington citizens in order to incentivize use of the Program.

Moreover, although the current Program has labeling requirements that require that all products must include the manufacturer's brand name as registered with the Department of Ecology,²⁵⁰ these requirements should be tightened. Again, the European model can be used. The EU's WEEE Directive requires informational campaigns to educate end users about their

responsibility to dispose of equipment properly by including a standardized label on electronic products that warns against disposal in regular municipal waste.²⁵¹ Similarly, in addition to requiring the manufacturer's brand name on the label, the labels should include a notice that the products cannot be disposed of with ordinary trash and provide the E-Cycle website and toll-free number.

Labels should also include information about the levels of certain toxic components in the products and how much of the product is made from recycled materials. This information will help consumers make informed purchasing decisions, and it will create the necessary pressure on manufacturers to create greener product designs.

E. Export

Finally, the biggest loophole of the E-Cycle Washington Program is the lack of minimum exporting standards. Although this is a constitutional obstacle because Washington cannot regulate foreign commerce,²⁵² instead of only requiring the consent of recipient countries,²⁵³ the state could follow California's lead and make it illegal to export goods in violation of recipient countries' laws.²⁵⁴ Even if this were to be done, the effectiveness of E-Cycle Washington's action to prevent the dumping and "recycling" of toxic waste in developing countries is limited unless action is taken at a federal level.

While many are willing to acknowledge that manufacturers, as producers of e-waste, should bear responsibility for their products, fewer are willing to accept that the countries that consume the products should also bear responsibility for their wastes. For example, although the EPA acknowledges the e-waste problem, it is of the opinion that because most electronics are manufactured abroad, it makes sense to recycle electronics abroad and that all that is required is for international recycling standards to be upgraded.²⁵⁵ The problem with such an approach is that there is always a risk associated with recycling and disposing of toxic materials, and if the process is dangerous in the United States, it is only more dangerous in

developing countries that have fewer resources and lower occupational and environmental standards. Further, such an approach protects U.S. citizens—the consumers who benefit from the products—and our immediate environment at the cost of the citizens and environment of other poorer countries, which have not benefited from product use.

Apart from the injustice of burdening poor nations with the wastes produced by the developed world's luxuries, the ability of rich, industrialized countries to export toxic wastes to developing nations delays the adoption of cleaner production and technology in both rich and poor countries.²⁵⁶ This is because the ability to export toxic e-waste means that the receiving nations are saddled with the externalities of the electronic products, and manufacturers and consumers do not have to bear the true costs of the products they produce and enjoy. Thus as the e-waste stream continues to grow, exports effectively minimize the incentives for greener design at the cost of the environment and health in all societies. For these reasons, it is time for the United States to join the rest of the developed world in standing up to its responsibilities by ratifying both the Basel Convention and Basel Ban Amendment.

1. Ratify the Basel Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal

Public outcry about the targeting²⁵⁷ of developing countries for indiscriminate hazardous waste dumping in the mid-1980s²⁵⁸ led 116 nation-states to negotiate and sign the Basel Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal (Convention) in 1989.²⁵⁹ Both developed and developing countries accepted the Convention's guiding principle that each country should be held accountable for its own hazardous wastes²⁶⁰ and acknowledged that hazardous waste should not be subject to free international trade.²⁶¹

The Convention aims to prevent rich, industrialized countries from exploiting developing countries and to achieve environmentally sound

management (ESM) of hazardous wastes by (a) minimizing hazardous waste generation, (b) managing hazardous wastes to prevent pollution, (c) promoting national self-sufficiency in hazardous waste management by treating and disposing of wastes as close as possible to their place of generation, and (d) minimizing transboundary movement of hazardous wastes.²⁶² The Convention regulates, but does not ban, trade in hazardous waste.²⁶³ It requires prior informed consent²⁶⁴ from the recipient country for each specific import, and it prohibits waste exports to nation-states that are parties of the Convention and have banned imports of wastes under their domestic law, particularly if such states are developing countries.²⁶⁵

E-waste would be controlled by the Convention because CRTs are specifically classified as a hazardous waste by the Convention, and the Convention also covers wastes containing mercury, lead, cadmium, and beryllium.²⁶⁶ Thus, the United States' ratification of the Convention would be important progress in addressing e-waste dumping and "recycling" in developing countries.

There are currently one hundred and seventy parties to the Convention,²⁶⁷ yet the United States remains the only developed country in the world not to have ratified the treaty.²⁶⁸ In fact, the United States is one of only three countries that have signed, but not ratified the Convention; the other two countries are Haiti and Afghanistan²⁶⁹—hardly countries with economic or political powers comparable to the United States. Aside from the question of whether the United States has violated international law by implementing various acts contrary to the Convention's purpose,²⁷⁰ it is deplorable that the world's most wasteful country per capita²⁷¹ can behave so selfishly and irresponsibly.²⁷²

2. Ratify the Basel Ban Amendment

During the negotiations leading up to the Basel Convention, most countries wanted an outright ban on exports of hazardous waste to developing countries, but the United States fought to reject this

prohibition.²⁷³ As a result, many countries were disappointed by the 1989 Convention, and subsequently, Greenpeace denounced it for licensing exports of hazardous waste.²⁷⁴ In addition, despite the Convention, more than 90 percent of exported toxic waste flowed through a loophole that exempted goods shipped for recycling from the Convention.²⁷⁵

Consequently, through a series of Conference of Parties (COP) Decisions instigated by European nations at meetings of Convention member nations, a consensus to amend the Convention, the Basel Ban Amendment, was reached.²⁷⁶ The Basel Ban Amendment (Ban Amendment) is a complete ban on hazardous waste exports, for both recycling and disposal, from OECD countries—thirty developed European countries as well as the United States, Japan, and Korea²⁷⁷—to non-OECD countries.²⁷⁸ The Ban Amendment also prohibits imports of hazardous wastes into non-OECD countries.²⁷⁹

The primary rationale behind the Ban Amendment was that exports to non-OECD countries carry a high risk of not comporting with ESM of toxic wastes, as is required by the Basel Convention.²⁸⁰ This is because waste exports violate ESM principles (b) and (c)²⁸¹—of promoting national self-sufficiency in hazardous waste management and minimizing transboundary movements of hazardous wastes—and also because many non-OECD countries lack the technical capacity to manage hazardous wastes to prevent pollution.²⁸²

Although Convention members may choose to ratify and adopt the Ban Amendment independently of the Convention, the Ban Amendment does not become part of the Convention until a certain number of nation-states have ratified it.²⁸³ There are three different interpretations of the number of ratifications required for the Ban Amendment to become part of the Convention and hence binding on all Convention states.²⁸⁴ The Ban Amendment has not yet become part of the Convention,²⁸⁵ but it has had some impact simply because it has been adopted by many Convention states²⁸⁶ including China, France, Germany, and the United Kingdom.²⁸⁷

Nonetheless, the United States has not only failed to ratify the Ban Amendment, but it has also tried to reverse the Ban Amendment. In addition, there have been various efforts by the recycling industry to weaken the Ban Amendment.²⁸⁸

It is critical that the United States ratify both the Basel Ban Amendment and the Convention, because without the Ban Amendment, there is a huge recycling loophole through which e-waste can still flow. At the same time, by taking a lead among historically resistant countries, such as Canada and Australia, and ratifying the Ban Amendment, the United States can play an active role in bringing the Ban Amendment into force and resolving the debate about the number of ratifications required.²⁸⁹

The Ban Amendment will block exports of hazardous wastes to non-OECD countries, and thus, it will stop the abuse of developing countries with toxic waste. Moreover, if the hazardous parts are removed from goods in the reuse stream before export,²⁹⁰ a trade in viable and working products can be used to help bridge the digital divide.

Some critics have argued that the Ban Amendment may cause economic harm to developing countries where burgeoning economies need the income that can be derived from the secondary materials in e-waste.²⁹¹ However, such a view relies on the misconception that income derived from free trade—even of toxic wastes—is more valuable to a country than the health and wellbeing of its citizens and its environment. This shortsighted economic view ignores the fact that the true wealth of a country is ultimately in the health of its workers and environment.

IV. CONCLUSION

The electronics that are an integral part of modern American life are a source of toxicity that threatens our immediate environment. However, because e-waste creates a hazardous waste stream that follows the path of lower costs and lower standards,²⁹² it also unjustly threatens the lives and environments of some of the world's poorest communities. When our e-

waste ends up in makeshift, leaking dumps and open fires in poor parts of the developing world, we not only violate environmental justice principles, but also put unsuspecting American children at risk.

Washington's E-Cycle Program is a major accomplishment in regulating the recycling and disposal of electronics. The Program will keep toxic electronics out of the state's landfills and will go a long way to regulating unscrupulous "recyclers." Nonetheless, to the extent that e-waste exports will still be permitted, the Program is inadequate. Therefore, even if out of self-interest, citizens and representatives must push for a ratification of the Basel Convention and the Basel Ban Amendment. The E-Cycle Program can be improved to more effectively prevent toxic pollution and bridge the digital divide by requiring all processors to maintain chain-of-custody records of toxic components and all collectors to test products to determine whether they can be reused.

In addition, the E-Cycle Program is inadequate because it only applies to certain electronic products generated by household and small corporate or government users. Therefore, the Program should be revised to broaden the scope of the covered electronic products to include cellular phones, printers, fax machines, and other toxic household appliances, and manufacturers should also share responsibility for the e-waste generated by large corporate and government entities. Finally, the Program could more effectively encourage "green" design by imposing limits on the hazardous substances used in electronic products and continuing to promote customer awareness through the inclusion of notices of toxicity levels and recycling requirements on electronic products.

¹ JD, Seattle University School of Law, 2009; BSc (Eng.), Chemical Engineering, University of Cape Town, South Africa, 2002. I dedicate this article to my late father, William Patrick Niven Sceales, whose legal career, passion for justice and equality, and love and sacrifices for me are a continual source of inspiration. I also extend sincere thanks to Elizabeth Greene, Marsha Mavunkel, Amanda Spencer, Amy Pritchard, and the editing staff of the *Seattle Journal for Social Justice* for their advice and hard work.

² Rob Courtney, *Evolving Hazardous Waste Policy for the Digital Era*, 25 STAN. ENVTL. L.J. 199, 227 (2006).

³ Betsy M. Billingham, *E-Waste: A Comparative Analysis of Current and Contemplated Management Efforts by the European Union and the United States*, 16 COLO. J. INT'L ENVTL. L. & POL'Y 399, 400 (2005).

⁴ Lisa Stiffler, *State Recycling Plan Could be Poison for Other Countries*, SEATTLE POST-INTELLIGENCER, Sept. 12, 2007, at B1.

⁵ According to the Washington Department of Ecology, approximately 3.5 million CRT monitors will become obsolete in the state between 2003 and 2010. WASH. DEP'T OF ECOLOGY, PUBL'N NO. 06-07-017, FOCUS ON WASHINGTON'S ELECTRONIC PRODUCT RECYCLING PROGRAM 1 (2006), available at <http://www.ecy.wa.gov/pubs/0607017.pdf> [hereinafter ECOLOGY PUBL'N 06-07-017]. There is an estimated four to eight pounds of lead in every cathode ray picture tube. News Release, Wash. Dep't of Ecology, TV and Computer Manufacturers Must Register with State to Keep Selling Products Under Electronics Recycling Law (Feb. 21, 2007), available at www.ecy.wa.gov/news/2007news/2007-034.html.

⁶ THE BASEL ACTION NETWORK, BRIEFING PAPER 10, PREVENTING THE DIGITAL DUMP: ENDING "RE-USE ABUSE" (2007), http://www.ban.org/Library/BP10_09_07.pdf [hereinafter BRIEFING PAPER 10]; see also News Release, Wash. Dep't of Ecology, *supra* note 5.

⁷ News Release, Wash. Dep't of Ecology, *supra* note 5.

⁸ See BASEL ACTION NETWORK & SILICON VALLEY TOXICS COALITION, EXPORTING HARM: THE HIGH-TECH TRASHING OF ASIA 5 (2002), available at www.ban.org/E-waste/technotrashfinalcomp.pdf [hereinafter EXPORTING HARM] (discussing the challenges even well-intentioned recyclers face).

⁹ ECOLOGY PUBL'N 06-07-017, *supra* note 5.

¹⁰ Gordon Fairclough, *'E-Waste' From Computers Discarded in West Turns Up in China's Exported Trinkets*, WALL STREET JOURNAL, July 12, 2007, at B1; *Our E-waste Comes Back to Haunt Us*, (American Public Media radio broadcast Nov. 14, 2007), available at http://marketplace.publicradio.org/display/web/2007/11/14/consumed5_pm_1.

¹¹ WASH. ADMIN. CODE §§ 173-900-010-997 (2007); E-Cycle Washington, <http://www.ecy.wa.gov/programs/swfa/eproductrecycle/> (last visited Mar. 4, 2009).

¹² WASH. REV. CODE § 70.95N.030 (2006).

¹³ Extended Producer Responsibility is making manufacturers internalize the costs of the risks associated with the ecologically risky goods they produce. Courtney, *supra* note 2, at 211.

¹⁴ Washington was the fourth state to pass e-waste legislation (after California, Maine, and Maryland). As of October 2008, Connecticut, Illinois, Maine, Maryland, Minnesota, New Jersey, New York City, North Carolina, Oregon, Rhode Island, and Texas had passed e-waste laws that place responsibility on manufacturers; a number of other states have e-waste bills and laws under consideration. ELECTRONICS TAKEBACK COALITION, COMPARISONS OF STATE E-WASTE LAWS (2008), available at [http://www.e-takeback.org/docs%20open/Toolkit_Legislators/state%20legislation/Detailed%20State%](http://www.e-takeback.org/docs%20open/Toolkit_Legislators/state%20legislation/Detailed%20State%20)

20Law%20Comparison%20ALL.pdf; see also Laurie J. Flynn, *A State Says Makers Must Pay for Recycling PC's and TV's*, N.Y. TIMES, Mar. 25, 2006, at C2.

¹⁵ The Washington E-Cycle program only covers e-waste from households, small businesses, charities, small government, and school districts. WASH. ADMIN. CODE § 173-900-030 (2007). Large corporations and large governments are responsible for their own recycling programs. ECOLOGY PUBL'N 06-07-017, *supra* note 5.

¹⁶ Jennifer Kutz, *You've Got Waste: The Exponentially Escalating Problem of Hazardous E-waste*, 17 VILL. ENVTL. L.J. 307, 307 (2006).

¹⁷ CRTs (cathode ray tubes) are the glass tubes in electronics that have image screens, such as older, non-flat-screen televisions and computers. *Id.* at 308.

¹⁸ *Id.* at 307; EXPORTING HARM, *supra* note 8, at 5.

¹⁹ Kutz, *supra* note 16, at 307; EXPORTING HARM, *supra* note 8, at 5.

²⁰ Billinghamurst, *supra* note 3, at 400; EXPORTING HARM, *supra* note 8, at 5.

²¹ Courtney, *supra* note 2, at 209.

²² Kutz, *supra* note 16, at 307; see also U.S. GEOLOGICAL SURVEY, U.S. DEP'T OF THE INTERIOR, USGS FACT SHEET FS-060-01, OBSOLETE COMPUTERS, "GOLD MINE," OR HIGH-TECH TRASH? RESOURCE RECOVERY FROM RECYCLING (2001), available at <http://pubs.usgs.gov/fs/fs060-01/fs060-01.pdf> (describing the cyclic trend in the computer industry which enables users to purchase twice as powerful computers every eighteen months).

²³ *Our E-waste Comes Back to Haunt Us*, *supra* note 10.

²⁴ *Electronic Waste: Observations on the Role of the Federal Government in Encouraging Recycling and Reuse: Hearing Before the Subcomm. On Superfund and Waste Management of the S. Comm. On Env't and Public Works*, 109th Congr. (2005) (statement of John B. Stephenson, Director, Natural Resources and Environment, U.S. Government Accountability Office); July 26, 2005, available at <http://www.gao.gov/new.items/d05937t.pdf>; BASEL ACTION NETWORK, THE DIGITAL DUMP: EXPORTING RE-USE AND ABUSE TO AFRICA, 7 (2005), available at <http://www.ban.org/library/TheDigitalDump.pdf> [hereinafter THE DIGITAL DUMP].

²⁵ CASCADIA CONSULTING GROUP & SOUND RESOLUTIONS, E-WASTE GENERATION IN NORTHWEST WASHINGTON 1, 14 (2003), available at <http://www.productstewardship.net/PDFs/productsElectronicsSeattleEwasteRpt.pdf>.

²⁶ ECOLOGY PUBL'N 06-07-017, *supra* note 5, at 1.

²⁷ U.S. GEOLOGICAL SURVEY, *supra* note 22; CA-Recycle.com, About e-Waste, <http://www.ca-recycle.com/resources.cfm> (last visited Apr. 3, 2009).

²⁸ Courtney, *supra* note 2, at 209–10.

²⁹ *Id.*

³⁰ See Kutz, *supra* note 16, at 308–11.

³¹ CA-Recycle.com, *supra* note 27; Kutz, *supra* note 16, at 311.

³² Kutz, *supra* note 16, at 311.

³³ EXPORTING HARM, *supra* note 8, at 9.

³⁴ Kutz, *supra* note 16, at 308–09; News Release, Wash. Dep't of Ecology, *supra* note 5.

³⁵ ECOLOGY PUBL'N 06-07-017, *supra* note 5 (estimating that approximately 3.5 million CRT monitors will become obsolete between 2003 and 2010).

³⁶ Assuming the average CRT contains six pounds of lead, 3.5 million monitors would result in approximately twenty-one million pounds of lead. See ECOLOGY PUBL'N 06-07-017, *supra* note 5.

³⁷ *Id.*

³⁸ *Id.*

³⁹ Kutz, *supra* note 16, at 312.

⁴⁰ *Id.*; EXPORTING HARM, *supra* note 8, at 9.

⁴¹ EXPORTING HARM, *supra* note 8, at 9.

⁴² *Id.*

⁴³ CA-Recycle.com, *supra* note 27.

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ EXPORTING HARM, *supra* note 8, at 9.

⁴⁷ CA-Recycle.com, *supra* note 27.

⁴⁸ *Id.*; EXPORTING HARM, *supra* note 8, at 9.

⁴⁹ CA-Recycle.com, *supra* note 27.

⁵⁰ EXPORTING HARM, *supra* note 8, at 9.

⁵¹ CA-Recycle.com, *supra* note 27.

⁵² EXPORTING HARM, *supra* note 8, at 9.

⁵³ *Id.*

⁵⁴ CA-Recycle.com, *supra* note 27.

⁵⁵ EXPORTING HARM, *supra* note 8, at 10.

⁵⁶ Kutz, *supra* note 16, at 309.

⁵⁷ *Id.* at 310.

⁵⁸ EXPORTING HARM, *supra* note 8, at 9.

⁵⁹ Kutz, *supra* note 16, at 312.

⁶⁰ EXPORTING HARM, *supra* note 8, at 7.

⁶¹ *Id.*

⁶² JENNIFER CLAPP, TOXIC EXPORTS: THE TRANSFER OF HAZARDOUS WASTES FROM RICH TO POOR COUNTRIES 1 (2001) (emphasis in the original).

⁶³ *Id.*

⁶⁴ *Id.* at 36 (quoting Mostafa Tolba, Executive Director of the United Nations Environment Programme in 1992).

⁶⁵ Craig Lorch of Seattle's Total Reclaim is an environmentalist and businessman who is opposed to the idea of exporting e-waste to developing countries and has developed a means of managing leaded CRT glass locally. However, he said, "Every day we [recyclers] must make a choice between spending money to disassemble and manage material here or simply load it into a shipping container and sell it offshore. Why would a good business person allow spending [three] to [four] dollars to disassemble and handle material domestically when the same material can be sold offshore for [three] bucks. It's a [six] dollar swing—that's a make or break difference for a recycler." EXPORTING HARM, *supra* note 8, at 10.

⁶⁶ Courtney, *supra* note 2, at 207.

⁶⁷ EXPORTING HARM, *supra* note 8, at 5.

⁶⁸ Courtney, *supra* note 2, at 207.

⁶⁹ Aside from the toxic elements e-waste contains, there are also valuable materials and precious metals that can be recovered and reused, for example glass, plastics, steel, aluminum, as well as gold, silver, platinum, and copper. In fact, one metric ton of computer scrap contains more gold than seventeen tons of gold ore. In 1998, the amount of gold recovered from electronic scrap in the United States was equivalent to that recovered from two million metric tons of gold ore. U.S. GEOLOGICAL SURVEY, *supra* note 22.

⁷⁰ Courtney, *supra* note 2, at 213; Billingham, *supra* note 3, at 404.

⁷¹ U.S. GEOLOGICAL SURVEY, *supra* note 22.

⁷² Courtney, *supra* note 2, at 207.

⁷³ See, e.g., News Release, Wash. Dep't of Ecology, *supra* note 5.

⁷⁴ See *supra* note 14.

⁷⁵ As regulations have tightened, landfill capacities have decreased and there is more resistance to landfills. In the United States, landfill costs for dumping hazardous wastes rose from \$15 per ton in 1980 to \$250 per ton in 1988. CLAPP, *supra* note 62, at 23; see also Billingham, *supra* note 3, at 401.

⁷⁶ Recycled parts of an old computer might be worth a total of \$4.24 on the domestic market: \$2 for the motherboard with its gold, silver, and copper connectors; \$1 for the CPU with its gold tips; \$0.80 for the monitor yoke; \$0.25 for five pounds of steel; \$0.10 for the 15 percent aluminum hard drive; and \$0.09 for copper cable. EXPORTING HARM, *supra* note 8, at 8.

⁷⁷ Kutz, *supra* note 16, at 314.

⁷⁸ EXPORTING HARM, *supra* note 8, at 2.

⁷⁹ *Id.* at 8.

⁸⁰ Kutz, *supra* note 16, at 314.

⁸¹ EXPORTING HARM, *supra* note 8, at 12.

⁸² *Id.* at 2.

⁸³ See Joseph Stiglitz, *Globalism's Discontents*, AM. PROSPECT (2002), available at <http://www.globalpolicy.org/globaliz/econ/2002/0114stiglitz.htm> (describing how the trade-liberalization has favored developed countries). The debate on trade liberalization and the effects of globalization is beyond the scope of this article. See generally *id.*; CLAPP, *supra* note 62, at 6–8 (contrasting the view of liberal economists—that free-trade agreements should take precedence over multilateral environmental agreements because multilateral environmental regulations may hinder trade and economic growth to the environment's detriment—with the view of environmentalists and ecological economists that although free trade may encourage economic growth, it also increases throughput and the threat of industry flight to pollution havens, and therefore, free trade needs to be reined in with strong, global-level regulatory measures to protect the environment).

⁸⁴ CLAPP, *supra* note 62, at 3, 10, 12, 24.

⁸⁵ See *infra* Section III E (discussing the Basel Convention and Basel Ban Amendment and why the United States should ratify both).

⁸⁶ See BRIEFING PAPER 10, *supra* note 6.

⁸⁷ See THE DIGITAL DUMP, *supra* note 24, at 1.

⁸⁸ See *id.*

⁸⁹ See *id.*

⁹⁰ Microloans are made available to grassroots entrepreneurs to purchase cell phones. These individuals then pay off their loan and increase their income by renting out the use of the phones on a per-call basis. At the same time, the local community is provided with affordable telecommunications. Grameen Foundation, Village Phone: Connecting Technology and Innovation, http://www.grameenfoundation.org/what_we_do/technology_programs/village_phone/ (last visited Apr. 3, 2009); ShareIdeas.Org, Case Studies: Economic Empowerment, Village Phone: Bringing Mobile Communications to Rural Areas, http://www.shareideas.org/index.php/Village_Phone:_Bringing_Mobile_Communications_to_Rural_Areas (last visited Apr. 3, 2009).

⁹¹ ShareIdeas.Org, Case Studies: Economic Empowerment, Rural Banks in the Philippines: Using Mobile Phones for Microfinance, http://www.shareideas.org/index.php/Rural_Banks_in_the_Philippines:_Using_Mobile_Phones_for_Microfinance (last visited Apr. 3, 2009); *see* ShareIdeas.Org, Case Studies: Economic Empowerment, Mobile Banking in South Africa, http://www.shareideas.org/index.php/Mobile_Banking_in_South_Africa (last visited Apr. 3, 2009).

⁹² Cell-Life.org, <http://www.cell-life.org/> (last visited Apr. 3, 2009). Cell-Life makes the most of the fact that 94 percent of South Africa is covered by cell-phone networks and up to 60 percent of the population uses cell phones. Cell-Life uses cell phones to improve and monitor antiretroviral treatment of HIV/AIDS victims, who would otherwise not have access to medical assistance. ShareIdeas.Org, Case Studies: Health and Safety, Cell-Life: Using Mobile Technology to Prevent and Treat HIV/AIDS in South Africa, http://www.shareideas.org/index.php/Cell-Life:_Using_Mobile_Technology_to_Prevent_and_Treat_HIV/AIDS_in_South_Africa (last visited Apr. 3, 2009).

⁹³ *See* THE DIGITAL DUMP, *supra* note 24, at 1–2.

⁹⁴ Lilian Yap, *The Basel Convention and Global Environment (Non)Governance: Transformismo and the Case of Electronic Wastes*, 3 UNDERCURRENT 23, 28 (2006).

⁹⁵ CLAPP, *supra* note 62, at 31–32.

⁹⁶ *Id.* at 2.

⁹⁷ *Id.* at 10.

⁹⁸ *See, e.g.*, EXPORTING HARM, *supra* note 8, at 15, 23 (describing how in China, rural farming communities have been transformed into e-waste processing centers, and in New Delhi, India, child labor is used to burn circuit boards).

⁹⁹ *See* CLAPP, *supra* note 62, at 38.

¹⁰⁰ Agriculture is the main source of income and employment for 70 percent of the world's poor in rural areas. As a result, degradation of natural and agricultural resources is a serious threat to the livelihood of rural populations in developing countries and a challenge to food supplies for urban populations in these countries. WORLD BANK, 2007 WORLD DEVELOPMENT INDICATORS 121, *available at* <http://siteresources.worldbank.org/DATASTATISTICS/Resources/WDI07section3-intro.pdf>.

¹⁰¹ Laurie Garrett, *The Challenge of Global Health*, FOREIGN AFF., Jan./Feb. 2007, *available at* <http://www.foreignaffairs.org/20070101faessay86103/laurie-garrett/the-challenge-of-global-health.html>.

¹⁰² *See* UNITED NATIONS, THE MILLENNIUM DEVELOPMENT GOALS REPORT 2007, *available at* <http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2007/UNS>

D_MDG_Report_2007e.pdf.

¹⁰³ In India and Pakistan, the Basel Action Network observed crude and dangerous e-waste “recycling” conditions similar to those in China described below, and anecdotal information suggests that e-waste exports are also being directed to other South East Asian and African countries. EXPORTING HARM, *supra* note 8, at 23–25; THE DIGITAL DUMP, *supra* note 24, at 9–10.

¹⁰⁴ Associated Press (San Francisco, Cal.), *Destination of “Recycled” Electronics May Surprise You*, CNN.COM, Nov. 19, 2007 (on file with author).

¹⁰⁵ CLAPP, *supra* note 62, at 3.

¹⁰⁶ EXPORTING HARM, *supra* note 8 at 1–2.

¹⁰⁷ *Id.* at 1.

¹⁰⁸ Environmental justice espouses the principle that people should not be forced to bear a disproportionate burden of environmental risks simply because of their race or economic status. EXPORTING HARM, *supra* note 8, at 3.

¹⁰⁹ *Id.* at 7.

¹¹⁰ *Destination of “Recycled” Electronics May Surprise You*, *supra* note 104; EXPORTING HARM, *supra* note 8, at 1.

¹¹¹ *Destination of “Recycled” Electronics May Surprise You*, *supra* note 104.

¹¹² EXPORTING HARM, *supra* note 8, at 8.

¹¹³ Kutz, *supra* note 16, at 314.

¹¹⁴ The Basel Action Network is a nonprofit organization focused on the environmental justice issues of trade in toxic wastes, products, and technologies from rich to poorer countries. Basel Action Network, *About the Basel Action Network—BAN*, http://www.ban.org/main/about_BAN.html (last visited Mar. 3, 2009).

¹¹⁵ EXPORTING HARM, *supra* note 8, at 15–22.

¹¹⁶ *Id.* at 16.

¹¹⁷ *Id.* at 18.

¹¹⁸ *Id.* at 22.

¹¹⁹ *Id.* at 17, 19–21.

¹²⁰ *Id.* at 17–18.

¹²¹ *Id.* at 19.

¹²² Haley Edwards, *Toy-Safety Debate Continues*, SEATTLE TIMES, Mar. 28, 2008, at B1.

¹²³ Fairclough, *supra* note 10, at B1 (stating that lead in jewelry samples was found to contain levels of copper and tin that suggested the source was lead solder from electronic circuit boards, and other jewelry samples contained antimony, a toxic element used to harden lead in batteries); *Our E-waste Comes Back to Haunt Us*, *supra* note 10; Jeffrey D. Weidenhamer, *Leaded Electronic Waste is a Possible Source Material for Lead-contaminated Jewelry*, CHEMOSPHERE JOURNAL (2007), available at www.sciencedirect.com.

¹²⁴ THE DIGITAL DUMP, *supra* note 24, at 37 (quoting Prof. Oladele Osibanjo, Director, Basel Convention Regional Coordinating Center, Ibadan, Nigeria).

¹²⁵ BRIEFING PAPER 10, *supra* note 6.

¹²⁶ A 2005 BAN investigation revealed that as much as 75 percent of the material exported to Lagos, Nigeria, under the pretense of reuse was in fact strictly waste. All or part was irreparable even in a country with excellent electronic engineers. *Id.*

¹²⁷ THE DIGITAL DUMP, *supra* note 24, at 2.

¹²⁸ Liz Carney, *Nigeria Fears E-waste 'Toxic Legacy'*, BBC NEWS, Dec. 19, 2006, <http://news.bbc.co.uk/2/hi/africa/6193625.stm>; THE DIGITAL DUMP, *supra* note 24, at 2.

¹²⁹ THE DIGITAL DUMP, *supra* note 24, at 15.

¹³⁰ *Id.* at 6.

¹³¹ *Id.* at 23.

¹³² *Id.*

¹³³ BRIEFING PAPER 10, *supra* note 6.

¹³⁴ “The legislature finds that a convenient, safe, and environmentally sound system for the collection, transportation, and recycling of covered electronic products must be established. The legislature further finds that the system must encourage the design of electronic products that are less toxic and more recyclable. The legislature further finds that the responsibility for this system must be shared among all stakeholders, with manufacturers financing the collection, transportation, and recycling system.” WASH. REV. CODE § 70.95N.010 (2006); *see also* WASH. ADMIN. CODE § 173-900-010 (2007), available at <http://www.ecy.wa.gov/pubs/0707042.pdf>; Wash. Dep’t of Ecology, www.ecy.wa.gov/programs/swfa/eproductrecycle.

¹³⁵ End-of-life responsibility encompasses products even after the consumer discards them.

¹³⁶ *See supra* note 14.

¹³⁷ ECOLOGY PUBL’N 06-07-017, *supra* note 5; *see also* Courtney, *supra* note 2, at 211–213 (discussing EPR in the European context).

¹³⁸ E-Cycle Washington, *supra* note 11.

¹³⁹ WASH. ADMIN. CODE §§173-900-010 to -997 (2007).

¹⁴⁰ WASH. ADMIN. CODE § 173-900-030 (2007); WASH. REV. CODE § 70.95N.020 (2006). Motor vehicles and their component parts, medical devices, household appliances, and mobile phones are not covered by the Program. *Id.*

¹⁴¹ *Supra* note 135.

¹⁴² WASH. REV. CODE § 70.95N.040 (2006); WASH. ADMIN. CODE §§ 173-900-200, -205, -230 (2007).

¹⁴³ WASH. ADMIN. CODE § 173-900-200 (2007).

¹⁴⁴ WASH. ADMIN. CODE § 173-900-210 (2007).

¹⁴⁵ *Id.*

¹⁴⁶ WASH. ADMIN. CODE §§ 173-900-255, -260 (2007).

¹⁴⁷ “Manufacturer” is defined for the purposes of Washington’s Electronic Product Recycling law in WASH. REV. CODE § 70.95N.020(14) (2006).

¹⁴⁸ WASH. REV. CODE § 70.95N.030 (2006); WASH. ADMIN. CODE §§ 173-900-300, -330 (2007).

¹⁴⁹ WASH. ADMIN. CODE § 173-900-030 (2007).

¹⁵⁰ ECOLOGY PUBL’N 06-07-017, *supra* note 5, at 1; WASH. ADMIN. CODE § 173-900-355(1) (2007); *see also* WASH. DEP’T OF ECOLOGY, PUBL’N NO. 07-07-040, ELECTRONIC PRODUCT RECYCLING PROGRAM: FINAL COST BENEFIT AND LEAST BURDENSOME ANALYSIS FOR AMENDMENTS TO CHAPTER 173-900 WAC AND CHAPTER 173-303 WAC 22 (2007), available at <http://www.ecy.wa.gov/pubs/0707040.pdf>.

¹⁵¹ This Authority is operated and financed by manufacturers, although the state has seats on the board. The authority contracts out for the collection, transportation, and recycling of the covered electronics. ELECTRONICS TAKEBACK COALITION, *supra* note 14; *see also* Washington Materials Management and Financing Authority <http://www.wmmfa.net/> (last visited Apr. 3, 2009).

¹⁵² WASH. ADMIN. CODE § 173-900-305 (2007).

¹⁵³ WASH. ADMIN. CODE § 173-900-310 (2007).

¹⁵⁴ WASH. ADMIN. CODE §§ 173-900-030, -300, -305, -310 (2007).

¹⁵⁵ WASH. ADMIN. CODE §§ 173-900-320(7), (8), (9) (2007).

¹⁵⁶ WASH. ADMIN. CODE § 173-900-320(16) (2007).

¹⁵⁷ “‘Direct processor’ means a processor contracted with a [covered electronic product] recycling plan to provide processing services for the plan.” WASH. ADMIN. CODE § 173-900-030 (2007).

¹⁵⁸ WASH. ADMIN. CODE § 173-900-320(10) (2007).

¹⁵⁹ WASH. ADMIN. CODE § 173-900-335 (2007).

¹⁶⁰ WASH. ADMIN. CODE §§ 173-900-370, -380, -390 (2007).

¹⁶¹ The plan is required to provide collection services in each county of the state. WASH. ADMIN. CODE § 173-900-355 (2).

¹⁶² WASH. ADMIN. CODE § 173-900-400 (2007).

¹⁶³ WASH. ADMIN. CODE §§ 173-900-450, -460, -470, -480, -490 (2007).

¹⁶⁴ WASH. ADMIN. CODE §§ 173-900-355, -450 (2007).

¹⁶⁵ “‘Transporter’ means an entity that transports covered electronic products from collection sites or services to processors or other locations for the purpose of recycling, but does not include any entity or person that hauls their own unwanted electronic products.” WASH. ADMIN. CODE § 173-900-030 (2007).

¹⁶⁶ WASH. ADMIN. CODE §§ 173-900-500, -550, -560, -570, -580, -590 (2007).

¹⁶⁷ WASH. ADMIN. CODE § 173-900-550(4) (2007).

¹⁶⁸ WASH. ADMIN. CODE § 173-900-320(9) (2007).

¹⁶⁹ WASH. ADMIN. CODE § 173-900-600(1)(f) (2007).

¹⁷⁰ WASH. ADMIN. CODE § 173-900-650 (2007).

¹⁷¹ WASH. ADMIN. CODE §§ 173-900-365, -650 (2007); *see also* WASH. DEP’T OF ECOLOGY, ENVIRONMENTALLY SOUND MANAGEMENT AND PERFORMANCE STANDARDS FOR DIRECT PROCESSORS, PUBL’N NO. 07-07-046, at 15 (2007), *available at* <http://www.ecy.wa.gov/programs/swfa/eproductrecycle/docs/PreferredPerformanceStdsFinal2007.pdf> [hereinafter WASH. DEP’T OF ECOLOGY, PUBL’N NO. 07-07-046].

¹⁷² WASH. ADMIN. CODE § 173-900-650(9)(a) (2007).

¹⁷³ WASH. ADMIN. CODE § 173-900-650(11)(a)(i) (2007).

¹⁷⁴ WASH. ADMIN. CODE § 173-900-300(3)(a) (2007).

¹⁷⁵ Because manufacturers may share CTPR plans with several other manufacturers (e.g. the Standard Plan administered by the Washington Materials Management and Financing Authority), an “equivalent share” weight in pounds of covered electronic products is calculated to determine each manufacturer’s responsibility for the CTPR costs. *See* WASH. ADMIN. CODE §§ 173-900-030, -930, -940, -950 (2007).

¹⁷⁶ WASH. ADMIN. CODE § 173-900-940 (2007); *see also* ELECTRONICS TAKEBACK COALITION, *supra* note 14, at 4. For example, if a plan contracts with a reuse charity for

collection and that organization collects one hundred computers, twenty of which are reusable, then the weight of the eighty computers that must be recycled (i.e., cannot be reused) will count towards the annual equivalent share goal for collection and recycling. Reuse is encouraged by crediting manufacturer/plan with an extra 5 percent of the weight of the eighty computers that had to be recycled, i.e., the manufacturer/plan will actually receive equivalent share credit 1.05 times the weight collected for recycling. Telephone interview with Segó Jackson, Principal Planner, Snohomish County Solid Waste Management Division, in Seattle, Wash. (Feb. 15, 2008).

¹⁷⁷ WASH. ADMIN. CODE § 173-900-650(11)(b)(ii) (2007).

¹⁷⁸ See *Washington's New E-Waste Law Hits Snag* (KUOW News broadcast Feb. 9, 2009), available at <http://www.kuow.org/program.php?id=16883>; H.B. 1522, Reg. Sess. (Wash. 2009) (as of Mar. 25, 2009, the bill that will allow refurbishment and encourage reuse has passed in both the House and the Senate).

¹⁷⁹ WASH. ADMIN. CODE § 173-900-650(6)(a) (2007).

¹⁸⁰ WASH. DEP'T OF ECOLOGY, PUBL'N NO. 07-07-046, *supra* note 171, at 9.

¹⁸¹ *Id.*

¹⁸² *Id.*

¹⁸³ "Materials of concern" include devices containing mercury or PCBs, batteries, CRTs, leaded glass, and circuit boards. *Id.* at 8.

¹⁸⁴ *Id.* at 12.

¹⁸⁵ *Id.*

¹⁸⁶ WASH. ADMIN. CODE § 173-900-700 (2007).

¹⁸⁷ WASH. ADMIN. CODE § 173-900-700 requires that the manufacturer's status is "in compliance" or "pending."

¹⁸⁸ ECOLOGY PUBL'N 06-07-017, *supra* note 5, at 1.

¹⁸⁹ Responsibility for products even after the consumer discards them.

¹⁹⁰ See WASH. REV. CODE § 70.95N.010 (2006).

¹⁹¹ News Release, Wash. Materials Mgmt. & Fin. Auth., E-Cycle Washington Launch Beats Expectations (Feb. 13, 2009), available at <http://www.wmmfa.net/documents/pdf/WMMFApressreleaseFeb132009.pdf>.

¹⁹² *Processor Performance Standards Adopted*, E-NEWSL. (Wash. Materials Mgmt. & Fin. Auth., Woodland, Wash.), Dec. 13, 2007, at 1, available at http://wmmfa.net/documents/pdf/newsletters/E-Newsletter_12_13_07.pdf.

¹⁹³ Telephone interview with Segó Jackson, *supra* note 176.

¹⁹⁴ CLAPP, *supra* note 62, at 3, 5.

¹⁹⁵ The Foreign Commerce Clause of the Constitution expressly delegates the power "[t]o regulate Commerce with foreign Nations" to the federal government. U.S. CONST. art. I, § 8, cl. 3; see also *Buttfield v. Stranahan*, 192 U.S. 470, 493 (1904) (discussing Congress's power to regulate imports into the United States).

¹⁹⁶ WASH. ADMIN. CODE § 173-900-030 (2007).

¹⁹⁷ ELECTRONICS TAKEBACK COALITION, *supra* note 14.

¹⁹⁸ Letter from Mark Small, Vice President, Corporate Environment Safety and Health, Sony Electronics, Inc., to Bernard F. Kenny, Jr., Chair of Budget and Appropriations Committee, New Jersey Senate (Dec. 7, 2007) (on file with the author).

- ¹⁹⁹ JAMES E. MCCARTHY, CRS REPORT FOR CONGRESS, RECYCLING COMPUTERS AND ELECTRONIC EQUIPMENT: LEGISLATIVE AND REGULATORY APPROACHES FOR “E-WASTE” 20, 21 (2005).
- ²⁰⁰ Courtney, *supra* note 2, at 225.
- ²⁰¹ *Id.* at 223.
- ²⁰² According to Rick Goss, Vice President of Environmental Affairs for the Electronic Industries Alliance trade group based out of Virginia, “None of our companies want to be contributing to some of the issues seen in China and Asia and some of the African countries as well.” Stiffler, *supra* note 4, at B1.
- ²⁰³ *Destination of “Recycled” Electronics May Surprise You*, *supra* note 104.
- ²⁰⁴ EXPORTING HARM, *supra* note 8, at 6.
- ²⁰⁵ Waste Management, *Waste Management and Sony Corporation “Sony Take-Back”*, <http://www.wm.com/WM/takeback/sony/index.asp> (last visited Mar. 4, 2009) (indicating that 160 electronic recycling sites have been established); Sony, *Sony’s Green Commitment*, www.sony.com/recycle (last visited Mar. 4, 2009); see Letter from Mark Small, *supra* note 198 (pledging to establish 150 recycling sites nationwide in 2008).
- ²⁰⁶ *Id.*
- ²⁰⁷ Kutz, *supra* note 16, at 317; see also MCCARTHY, *supra* note 199, at 4–5.
- ²⁰⁸ Kutz, *supra* note 16, at 320.
- ²⁰⁹ See generally WASH. ADMIN. CODE § 173-900 (2007).
- ²¹⁰ Courtney, *supra* note 2, at 213.
- ²¹¹ Kutz, *supra* note 16, at 321.
- ²¹² *Destination of “Recycled” Electronics May Surprise You*, *supra* note 104.
- ²¹³ Kutz, *supra* note 16, at 318.
- ²¹⁴ Telephone interview with Sego Jackson, *supra* note 176 (in response to a question of whether the drafters of Washington law considered including limits and phase-out dates for certain toxic constituents of covered electronic products).
- ²¹⁵ Courtney, *supra* note 2, at 219.
- ²¹⁶ ELECTRONICS TAKEBACK COALITION, *supra* note 14, at 4.
- ²¹⁷ Telephone interview with Sego Jackson, *supra* note 176.
- ²¹⁸ According to WASH. ADMIN. CODE § 173-900-030, small businesses are those employing less than fifty people.
- ²¹⁹ “‘Small government’ means a city in Washington state with a population less than fifty thousand, a county in Washington state with a population less than one hundred twenty-five thousand, and special purpose districts in Washington state.” WASH. ADMIN. CODE § 173-900-030 (2007).
- ²²⁰ WASH. ADMIN. CODE §§ 173-303-010 to -9907 (2007).
- ²²¹ WASH. ADMIN. CODE § 173-303-082 (2007).
- ²²² 42 U.S.C. §§ 6901–6992(k) (2009).
- ²²³ 42 U.S.C. § 6921(d) (2009).
- ²²⁴ MCCARTHY, *supra* note 199, at 2.
- ²²⁵ This is determined by a standardized Toxicity Characteristic Leachate Procedure meant to simulate the average landfill. Courtney, *supra* note 2, at 206.
- ²²⁶ See Courtney, *supra* note 2, at 206–07.
- ²²⁷ Billingham, *supra* note 3, at 411.

- ²²⁸ 42 U.S.C § 6938 (2006); Billingham, *supra* note 3, at 411.
- ²²⁹ Billingham, *supra* note 3, at 411.
- ²³⁰ *Id.*; see also MCCARTHY, *supra* note 199, at 3.
- ²³¹ Courtney, *supra* note 2, at 225.
- ²³² ECOLOGY PUBL'N 06-07-017, *supra* note 5, at 2; see also WASH. ADMIN. CODE § 173-900-030 (providing the definition of covered entities).
- ²³³ EXPORTING HARM, *supra* note 8, at 7.
- ²³⁴ See *supra* note 175.
- ²³⁵ WASH. DEP'T OF ECOLOGY, PUBL'N NO. 07-07-046, *supra* note 171, at 8.
- ²³⁶ *Processor Performance Standards Adopted*, *supra* note 192, at 1.
- ²³⁷ See *supra* Section II.
- ²³⁸ The “digital divide” is not between those with and without computers, but between those with state-of-the-art computers and those without. “A hand-me-down solution to the problem of the “digital divide,” then, will never completely eliminate the gap. . . . Seen in this light, it is not always so charitable to provide hand-me-down technology, which will become outdated in but a few years, particularly when that technology carries with it a substantial environmental burden. This is particularly true when weighed against other policy options, such as demanding toxic use reductions and investing in indigenous IT industries in developing countries.” BRIEFING PAPER 10, *supra* note 6.
- ²³⁹ EXPORTING HARM, *supra* note 8, at 5.
- ²⁴⁰ In 1993, only 3 percent of discarded computers went into reuse. *Id.* at 7.
- ²⁴¹ *Id.* at 2, 4.
- ²⁴² THE DIGITAL DUMP, *supra* note 24, at 4.
- ²⁴³ See S. Comm. on Environment, Water & Energy, Second Substitute Senate Bill Report, S. B. Rep. 2SHB-1522, Reg. Sess. (Wash. 2009); H. Comm. on General Gov't Appropriations, Second Substitute House Bill Report, H. B. Rep. 2SHB-1522, Reg. Sess. (Wash. 2009).
- ²⁴⁴ WASH. DEP'T OF ECOLOGY, PUBL'N NO. 07-07-046, *supra* note 171.
- ²⁴⁵ THE DIGITAL DUMP, *supra* note 24, at Appendix.
- ²⁴⁶ BRIEFING PAPER 10, *supra* note 6. By placing the additional burden on the state to regulate and ensure testing, certification, and labeling of electronics, the general public, not even specific consumers of the electronics would be paying for this action with taxes. Placing the burden on exporters is arguably a better situation, but this will fail to exert pressure on manufacturers to modify their production and implement cleaner technologies. In addition, placing the burden on exporters would mean the costs are directly passed on to the citizens who wish to recycle their goods responsibly. Although this in itself is fair, it still does not achieve the ultimate goal of encouraging cleaner technology.
- ²⁴⁷ See News Release, Wash. Materials Mgmt. & Fin. Auth., *supra* note 191.
- ²⁴⁸ E-Cycle Washington, *supra* note 11; E-Cycle Washington Brochure, available at http://www.wmmfa.net/documents/pdf/E-CycleBrochurev1_000.pdf.
- ²⁴⁹ See, e.g., *The Electronic Wasteland* (CBS News broadcast Nov. 9, 2008), available at http://www.cbsnews.com/video/watch/?id=4586903n%3fsource=search_video.
- ²⁵⁰ WASH. ADMIN. CODE § 173-900-210 (2007).
- ²⁵¹ Courtney, *supra* note 2, at 199, 213.

²⁵² Before the law was approved in March 2006, Governor Gregoire vetoed a section prohibiting the export of waste to developing countries because the state does not have constitutional authority to restrict exports. Stiffler, *supra* note 4, at B1.

²⁵³ *Supra* Section II.

²⁵⁴ Telephone interview with Sarah Westerveldt, Toxics Research Analyst, Basel Action Network, in Seattle, Wash. (Feb. 20, 2008).

²⁵⁵ *Destination of "Recycled" Electronics May Surprise You*, *supra* note 104 (quoting Matt Hale, head of EPA's Solid Waste Office).

²⁵⁶ CLAPP, *supra* note 62, at 2.

²⁵⁷ African and other developing countries were targeted because of their weak environmental laws, capacity for corruption, and limited control over state officials who approved the imports. CLAPP, *supra* note 62, at 32.

²⁵⁸ By 1990, half of all African countries had been approached to accept hazardous wastes. *Id.*

²⁵⁹ *Id.* at 38–44.

²⁶⁰ Billingham, *supra* note 3, at 401.

²⁶¹ CLAPP, *supra* note 62, at 3.

²⁶² THE BASEL ACTION NETWORK, BRIEFING PAPER 1, THE BASEL BAN: A TRIUMPH FOR GLOBAL ENVIRONMENTAL JUSTICE (2007), available at http://www.ban.org/Library/BP1_09_07.pdf [hereinafter BRIEFING PAPER 1]; see also Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, art. 4(2), Mar. 22, 1989, 1673 U.N.T.S. 126 [hereinafter Basel Convention].

²⁶³ CLAPP, *supra* note 62, at 3.

²⁶⁴ Basel Convention, *supra* note 262, at arts. 4(1)(c), 6; see also THE BASEL CONVENTION AT A GLANCE, http://www.basel.int/convention/bc_glance.pdf (last visited Apr. 3, 2009).

²⁶⁵ Basel Convention, *supra* note 262, at art. 4(2)(e).

²⁶⁶ EXPORTING HARM, *supra* note 8, at 33–34.

²⁶⁷ Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, Basel Convention's Ratifications, <http://www.basel.int/ratif/convention.htm> (last visited Apr. 3, 2009).

²⁶⁸ EXPORTING HARM, *supra* note 8, at 3.

²⁶⁹ Basel Convention's Ratifications, *supra* note 267.

²⁷⁰ Article 18 of the Vienna Convention on the Law of Treaties (Vienna Convention) requires that if nation-states are signatories but have not ratified a treaty, they are obliged to refrain from acts which would defeat the object and purpose of a treaty. However, this question is further complicated by the fact that the United States also signed, but did not ratify, the Vienna Convention on the Law of Treaties. On the other hand, U.S. courts have made several decisions in reliance on the Vienna Convention, which could have judicially incorporated its principles into domestic law, and U.S. officials have acknowledged that much of the Vienna Convention merely codifies pre-existing and accepted customary international law.

²⁷¹ Although China is set to overtake the United States as the world's largest emitter of carbon dioxide, the United States still consumes more energy overall while it also

consumes six times as much energy as China per capita. Kristi Heim, *Can a Bold New "Eco-City" Clear the Air in China?*, THE SEATTLE TIMES, Nov. 25, 2007, at A18.

²⁷² THE DIGITAL DUMP, *supra* note 24, at 3.

²⁷³ BRIEFING PAPER 1, *supra* note 262.

²⁷⁴ By the time the Basel Convention entered into force in 1992, over eighty-eight countries had, on their own initiative, banned the import of hazardous wastes through national laws and regional agreements. *Id.*

²⁷⁵ *Id.*; *see also* CLAPP, *supra* note 62, at 3–4.

²⁷⁶ BRIEFING PAPER 1, *supra* note 262; *see also* CLAPP, *supra* note 62, at 3–4.

²⁷⁷ Organisation for Economic Co-operation and Development, <http://www.oecd.org> (last visited Apr. 3, 2009). The OECD is an international organization of thirty countries committed to democracy and the free market economy. The OECD monitors and analyzes economic trends and social changes in trade, the environment, agriculture, and technology; it is also a forum for governments to compare and coordinate domestic and international policies. The forerunner to the OECD was formed in 1947 to administer American and Canadian aid under the Marshall Plan for the reconstruction of Europe post World War II. *Id.*

²⁷⁸ BRIEFING PAPER 1, *supra* note 262; *see also* CLAPP, *supra* note 62, at 3–4; Kutz, *supra* note 16, at 315.

²⁷⁹ BRIEFING PAPER 1, *supra* note 262; *see also* CLAPP, *supra* note 62, at 3–4; Kutz, *supra* note 16, at 315.

²⁸⁰ BRIEFING PAPER 1, *supra* note 262.

²⁸¹ *Supra* Section III E 1.

²⁸² BRIEFING PAPER 1, *supra* note 262.

²⁸³ Telephone interview with Sarah Westerveldt, *supra* note 254.

²⁸⁴ *Id.*

²⁸⁵ The Ban Amendment needs sixty-two ratifications in order to come into effect, and to date, sixty-three parties have ratified the the Amendment. However, a question remains as to whether it will enter into force because it is faced with much opposition and contains textual ambiguity. CLAPP, *supra* note 62, at 4; *see* THE BASEL ACTION NETWORK, BRIEFING PAPER 4, THE BASEL BAN AMENDMENT: ENTRY INTO FORCE = NOW! (2008), available at http://www.ban.org/Library/BP04_June_2008.pdf [hereinafter BRIEFING PAPER 4]; BRIEFING PAPER 10, *supra* note 6.

²⁸⁶ CLAPP, *supra* note 62, at 4.

²⁸⁷ BRIEFING PAPER 4, *supra* note 285; Basel Convention's Ratifications, *supra* note 267.

²⁸⁸ CLAPP, *supra* note 62, at 4.

²⁸⁹ *See supra* note 285.

²⁹⁰ *See supra* Section III C.

²⁹¹ Billingham, *supra* note 3, at 425.

²⁹² CLAPP, *supra* note 62, at 36 (quoting Mostafa Tolba, Executive Director of the United Nations Environment Programme in 1992).