

E-Waste Exports: Why the National Strategy for Electronics Stewardship Does Not Go Far Enough

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Every year, an unknown amount of used electronics and electronic waste (“e-waste”) is exported from the United States.¹ It has been estimated that 600,000 tons of selected consumer electronics were collected for recycling in the United States in 2009,² and that up to eighty percent of e-waste collected in the United States for recycling is actually exported.³ Some of this e-waste ends up in crude recycling operations in China, India, Nigeria, Ghana, and other parts of Africa and Asia, where recycling methods such as acid baths and open-air burning expose the workers, including young children, and the surrounding communities to dangerous chemicals and toxic fumes.⁴ The total amount of e-waste exported by the United States will likely continue to increase.⁵

In July 2011, the United States released the *National Strategy for Electronics Stewardship*.⁶ This report provides recommendations regarding steps the federal government and businesses can take to reduce harm from U.S. exports and to improve the safe handling of used electronics in developing countries.⁷ It comes on the heels of a number of other U.S. initiatives that examine the international trade in discarded electronic products and that seek to improve enforcement of e-waste regulations.⁸ This perspective piece argues that these initiatives, although steps in the right direction, do not go far enough in laying out a path for tightening U.S. laws and regulations covering the exports of e-waste and used electronics.

I. A Global Problem

Humans generate an estimated 20 million to 50 million tons of e-waste each year,⁹ an amount that is expected to grow to 40 million to 70 million tons by 2015.¹⁰ The fastest growth is expected to occur in the developing world.¹¹ Based on historical stock and sales data, Jinglei Yu and others predict that, by 2030, developing nations will discard 400 million to 700 million computers per year, compared to 200 million to 300 million computers in developed countries.¹² This massive growth in e-waste is occurring even though the developing world lacks the infrastructure, institutions, and legal capacity to manage this waste properly.¹³ E-waste contains toxic

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1. See JIM PUCKETT ET AL., BASEL ACTION NETWORK & SILICON VALLEY TOXICS COAL., EXPORTING HARM: THE HIGH-TECH TRASHING OF ASIA 14 (2002), available at <http://www.universaltrecyclers.com/Portals/0/technotrash.pdf>; *Frequent Questions*, EPA, <http://www.epa.gov/epawaste/conservematerials/recycling/faq.htm> (last updated Nov. 2, 2011) (“EPA has not yet developed a methodology to estimate the amounts of electronic products that were collected for recycling and subsequently managed and processed. Consequently, EPA cannot yet estimate the portion of electronics products collected for recycling that are subsequently exported.”). In this paper, I use the term *e-waste* to describe discarded electrical and electronic equipment. Under this broad definition, e-waste includes electrical or electronic goods that, once discarded, may be reused, refurbished, recycled, or disposed of permanently. U.S. federal laws do not contain a regulatory definition of e-waste. European Union law defines “waste electrical and electronic equipment” as “electrical or electronic equipment” that the holder disposes of, intends to dispose of, or is required to dispose of by law, “including all components, subassemblies and consumables which are part of the product at the time of discarding.” Council Directive 2002/96, art. 3(b), 2003 O.J. (L 37) 24, 27.
2. OFFICE OF SOLID WASTE, EPA, MUNICIPAL SOLID WASTE IN THE UNITED STATES: 2009 FACTS AND FIGURES 77 (2010), available at <http://www.epa.gov/epawaste/nonhaz/municipal/pubs/msw2009rpt.pdf>.
3. PUCKETT ET AL., BASEL ACTION NETWORK & SILICON VALLEY TOXICS COAL., *supra* note 1, at 14.
4. See, e.g., YAW AMOYAW-OSEI ET AL., GHANA —E-WASTE COUNTRY ASSESSMENT: SBC E-WASTE AFRICA PROJECT 54, 60, 69 (2011), available at www.ewasteguide.info/files/Amoyaw-Osei_2011_GreenAd-Empa.pdf; Alejandra Sepúlveda et al., *A Review of the Environmental Fate and Effects of Hazardous Substances Released from Electrical and Electronic Equipments During Recycling: Examples from China and India*, 30 ENVTL. IMPACT ASSESSMENT REV. 28, 29–32, 36, 37 (2010), available at www.ewasteguide.info/files/Sepulveda_2010_EIAR_0_0.pdf.
5. See OFFICE OF SOLID WASTE, EPA, *supra* note 2, at 72 (reporting an increase in the generation of consumer electronic products waste from 2000 to 2009).

6. INTERAGENCY TASK FORCE ON ELECS. STEWARDSHIP, NATIONAL STRATEGY FOR ELECTRONICS STEWARDSHIP 24–25 (2011), available at <http://www.epa.gov/epawaste/conservematerials/recycling/taskforce/docs/strategy.pdf>.
7. *Id.* at 24–30.
8. See discussion *infra* Part II.
9. Press Release, United Nations Env’t Programme, Basel Conference Addresses Electronic Wastes Challenge (Nov. 27, 2006), <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=485&ArticleID=5431&l=en>.
10. Mushtaq Ahmed Memon, United Nations Env’t Programme, Presentation at United Nations Environment Programme Regional Workshop on WEEE/E-waste Management: Capacity Building Activities by IETC 2 (July 12, 2010) http://www.unep.or.jp/ietc/spc/news-jul10/UNEP_IETC_Ewaste_July2010.pdf.
11. Press Release, United Nations Env’t Programme, *supra* note 9.
12. Jinglei Yu et al., *Forecasting Global Generation of Obsolete Personal Computers*, 44 ENVTL. SCI. & TECH. 3232, 3233, 3235 (2010), available at <http://pubs.acs.org/doi/full/10.1021/es903350q>.
13. See AMOYAW-OSEI ET AL., *supra* note 4, at 78–80; Sepúlveda et al., *supra* note 4, at 37–39; see also BASEL CONVENTION COORDINATING CTR. FOR ASIA &

materials such as lead, mercury, cadmium, barium, and chromium, polyvinyl chlorides and polychlorinated biphenyls.¹⁴ Numerous studies have documented how improper recycling practices of these wastes can release these toxic substances into the environment, causing a wide range of harmful respiratory, cardiovascular, and neurodevelopmental effects, including an increased risk of cancer in humans.¹⁵

The e-waste market is global in scope. When an owner discards an electronic product, it enters a waste stream that extends across borders and continents and passes through a chain of companies that refurbish, recycle, and reprocess the product's valuable components and that discard the rest.¹⁶ The economics of the e-waste trade often makes it more profitable for companies to send unusable or low-value electronic equipment and partially processed e-waste to poorer countries for recycling and final disposal, where few, if any, standards exist to protect workers or the environment.¹⁷

Some of this e-waste trade violates domestic laws that ban or restrict imports and exports of certain types of e-waste. China, for example, bans the import of various types of "metal waste" and "electronic apparatus" waste;¹⁸ Mexico

prohibits imports for disposal,¹⁹ but allows permitted imports for recycling and reprocessing;²⁰ and Europe bans the exports of hazardous e-waste to non-OECD countries.²¹

Furthermore, some countries are moving to investigate and respond to the challenges posed by international trade in e-waste more aggressively. For example, India is moving to enforce its existing laws more vigorously,²² and Ghana is finalizing new restrictions on e-waste imports.²³ Criminal Intelligence Service Canada²⁴ and Interpol²⁵ have identified illicit trafficking and disposal of e-waste as a cause for concern. In the United States, employees of the Government Accountability Office posed as fictitious foreign buyers of e-waste and found that forty-three of sixty-four U.S. companies to which they spoke were willing to export cathode ray tubes ("CRTs") in violation of U.S. law.²⁶ Similarly, inspections of exports by European border agents indicate that compliance with e-waste export requirements remains problematic,²⁷ and Hong Kong customs officials have intercepted numerous attempts to illegally export e-waste from the United States and Canada.²⁸

THE PAC., REPORT OF THE PROJECT ON 'THE IMPORT/EXPORT MANAGEMENT OF E-WASTE AND USED EEE' 1, 34 (2009), available at ch.bcrn.ca/download.jsp?pathfile=/atm/7/20100121101220387.pdf (reviewing government control practices in Asia).

14. *Hazardous Substances in e-Waste*, EWASTEGUIDE.INFO, <http://ewasteguide.info/node/219> (last visited Dec. 29, 2011).
15. See, e.g., AMOYAW-OSEI ET AL., *supra* note 4, at 70–73, 76, 77; Aimin Chen et al., *Developmental Neurotoxicants in E-Waste: An Emerging Health Concern*, 119 ENVTL. HEALTH PERSP. 431, 432 (2010), available at <http://ehp03.niehs.nih.gov/article/fechArticle.action?articleURI=info%3Adoi%2F10.1289%2Fehp.1002452>; Fangxing Yang et al., *Comparisons of IL-8, ROS and p53 Responses in Human Lung Epithelial Cells Exposed to Two Extracts of PM2.5 Collected from an E-waste Recycling Area, China*, ENVTL. RES. LETTERS, at 2 (2011), www.science.iop.org/1748-9326/6/2/024013/pdf/1748-9326_6_2_024013.pdf; Sheng Wen et al., *Elevated Levels of Urinary 8-Hydroxy-2'-deoxyguanosine in Male Electrical and Electronic Dismantling Workers Exposed to High Concentrations of Polychlorinated Dibenzo-p-dioxins and Dibenzofurans, Polybrominated Diphenyl Ethers, and Polychlorinated Biphenyls*, 42 ENVTL. SCI. & TECH 4202, 4202–07 (2008), available at <http://pubs.acs.org/doi/abs/10.1021/es800044m>.
16. See, e.g., Tom Knudson, *Recycled E-waste Often Ends Up Overseas*, NEWS TRIB. (Tacoma, Wash.), Jan. 12, 2010, <http://www.thenewtribune.com/2010/12/12/1461934/recycled-e-waste-often-ends-up.html>; see also METTECH RECYCLING, ADDENDUM TO STATE BID G110014, at 10–12, available at <http://purchasing.utah.gov/general/surplus/documents/mettechma2029full-contract.pdf>. Utah's procedures on e-waste collection and recycling provide a glimpse into the international nature of the e-waste trade. Utah has a contract with Mettech Recycling, which has eight recycling facilities throughout the United States, to collect and recycle its e-waste. *Id.* at 5. Mettech's contract bid outlines a process where various component substances are sent to subcontractors for further processing. For example, circuit boards are sent to Japan, plastics are sent to China, and cathode ray tube ("CRT") glass is first sent to Mexico to be cleaned and made into cullet form, and then to India where they are made into CRTs again. *Id.* at 10–12.
17. Elizabeth Grossman, *Not in Our Backyard: Exporting Electronic Waste*, in HIGH TECH TRASH: DIGITAL DEVICES, HIDDEN TOXICS, AND HUMAN HEALTH 182, 185 (2006); T. Knudson, *supra* note 16.
18. Announcement on Releasing Catalogue of Solid Wastes Forbidden to Import (promulgated by the State Envtl. Prot. Admin., Jan. 29, 2008, effective March 1, 2008) (China) available at http://english.mep.gov.cn/pv_obj_cache/pv_obj_id_E92A3C504196744F06A9643C2B9BAD52D51D0100/filename/P020080620470681400852.pdf.

19. Ley General de Equilibrio Ecológico y Protección al Ambiente [LGEPPA] [General Environmental Law], as amended, art. 153(III), Diario Oficial de la Federación [DO], 28 de Enero de 1988 (Mex.).
20. *Id.*
21. Council Regulation (EEC) 259/93, arts. 14, 16, 1993 O.J. (L 30) 1, 9–12; Council Regulation (EC) 1420/1999, art. 1, Annex A, 1999 O.J. (L 166) 6, 7, 9–22.
22. Manish Pachouly, *Customs initiative to curb e-waste import*, HINDUSTAN TIMES (July 25, 2011), <http://www.hindustantimes.com/Customs-initiative-to-curb-e-waste-import/Article1-725228.aspx>.
23. *Ghana to Curb E-waste Imports*, BIZTECH AFR. (July 23, 2011), <http://www.biztechafrika.com/section/computing/article/ghana-curb-e-waste-imports/949/>.
24. CRIMINAL INTELLIGENCE SERV. CAN., 2008 REPORT ON ORGANIZED CRIME 20–21 (2008). The CISC reports that crime rings use e-waste trafficking for profit, and illegal trafficking drives an environmental and human health crisis in Africa and several developing nations in Asia. *Id.* at 20. Criminal networks can collect e-waste in developed countries and sell it to "recyclers" in developing nations. *Id.*
25. POLLUTION CRIME WORKING GRP., INTERPOL, ELECTRONIC WASTE AND ORGANIZED CRIME: ASSESSING THE LINKS 30–35 (2009).
26. U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-08-1944, ELECTRONIC WASTE: EPA NEEDS TO BETTER CONTROL HARMFUL U.S. EXPORTS THROUGH STRONGER ENFORCEMENT AND MORE COMPREHENSIVE REGULATION 4, 5, 23–26 (2008). Because CRTs contain dangerous amounts of lead, the United States requires exporters to notify the EPA of planned CRT exports and to obtain consent from the receiving country. See *id.* at 2; 40 C.F.R. § 261.39(a)(5) § 261.40 (2011).
27. ANKE JOAS & ALEXANDER GRESSMAN, EUROPEAN UNION NETWORK FOR THE IMPLEMENTATION & ENFORCEMENT OF ENVTL. LAW, IMPEL-TFS ENFORCEMENT ACTIONS II: ENFORCEMENT OF EU WASTE SHIPMENT REGULATION: "LEARNING BY DOING," at ix–x (2011), available at <http://impel.eu/wp-content/uploads/2011/06/IMPEL-TFS-EA-II-Project-Final-report-adopted-v1-4.pdf>.
28. WCO REG'L INTELLIGENCE LIAISON OFFICE FOR ASIA & THE PAC., EVALUATION REPORT ON PROJECT SKY-HOLE-PATCHING 12–13, 16, 17 (2007), available at http://www.greencustoms.org/reports/workshop/Sky_hole_patching.pdf.

II. New U.S. Government Initiatives

The *National Strategy* outlines a comprehensive U.S. policy on the management of e-waste exports.²⁹ It provides recommendations for achieving four overarching goals: (1) to “Build Incentives for Design of Greener Electronics, and Enhance Science, Research and Technology Development in the United States;” (2) to “Ensure that the Federal Government Leads By Example;” (3) to “Increase Safe and Effective Management and Handling of Used Electronics in the United States;” and (4) to “Reduce Harm from US Exports of E-Waste and Improve Safe Handling of Used Electronics in Developing Countries.”³⁰ Specifically, with respect to exports of e-waste, it calls for:

- improving information on trade flows of used electronics, including revising the Harmonized Tariff Schedule in an effort to generate U.S. export statistics that distinguish between new and used electronic products;³¹
- “[p]rovid[ing] technical assistance and establish[ing] partnerships with developing countries to better manage used electronics;”³²
- “[w]orking with exporters to explore how to incentivize and promote the safe handling of remanufactured, recycled and used electronics at home and abroad;”³³
- “requir[ing] that Federal agencies only dispose of non-functional electronic equipment using contracts with sales or sales to refurbishers or recyclers certified under an accredited, third-party electronics recycler certification program;”³⁴
- “[l]aunch[ing] voluntary partnerships with the electronics industry” to “[i]ncrease collection of used electronics that is safely managed by certified recyclers;”³⁵
- regulatory changes to improve compliance with the existing requirements that govern CRT exports to allow for better tracking of CRT reuse and recycling;³⁶ and
- “[s]upporting ratification of the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal.”³⁷

29. See INTERAGENCY TASK FORCE ON ELECS. STEWARDSHIP, *supra* note 6, at 2–3.

30. *Id.*

31. *Id.* at 26–27.

32. *Id.* at 27–28.

33. *Id.* at 28.

34. *Id.* at 15.

35. *Id.* at 22; see *infra* note 99.

36. *Id.* at 29.

37. *Id.* at 29–30. The Basel Convention requires, *inter alia*, that exporters of hazardous waste receive the prior informed consent of the importing country, requires parties responsible for illegal trafficking to retrieve and dispose of illegally exported waste, and prohibits parties from exporting and/or importing with nonparties unless a bilateral, multilateral, or regional agreement compatible with the Convention is in place. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, arts. 6, 9, 11, March 22, 1989, 1673 U.N.T.S. 57 [hereinafter Basel Convention]. The United States has signed but not yet ratified the Basel Convention. Status of Basel Convention, UNITED NATIONS TREATY COLLECTION, http://treaties.un.org/pages/viewdetails.aspx?src=untsonline&tabid=2&mtdsg_no=xxviii-3&chapter=27&clang=en (last visited Dec. 30, 2011).

In addition to releasing the *National Strategy* in 2011, the U.S. Environmental Protection Agency (“EPA”) awarded a five-year, \$2.5 million grant to United Nations University’s Institute for Sustainability and Peace to help characterize the nature of e-waste trade and to address environmentally sound e-waste management and enforcement practices on a global scale.³⁸ In 2010, EPA started to work with Environment Canada and Mexico’s Ministry of Environment and Natural Resources through the North American Commission for Environmental Cooperation to estimate the transboundary movement of used and end-of-life computers and monitors within North America and to the rest of the world, and “to curb illegal imports and exports of electronic waste through intelligence sharing among [their respective] enforcement officials.”³⁹ In recent years, EPA has also supported e-waste workshops in Ghana⁴⁰ and Cambodia⁴¹ through the International Network for Environmental Compliance and Enforcement, and it has been active in Interpol’s global e-waste crime group.⁴²

III. Small Steps in the Right Direction

These initiatives are small steps in the right direction. Efforts to better understand the e-waste trade will be particularly helpful for U.S. policymakers, who have limited information on the shipping routes and ports used, the companies involved, and the ultimate destinations of e-waste exports.⁴³

By using certified recyclers and promoting the use of certification programs, the federal government can help build new markets for recyclers that manage e-waste in an environmentally sound manner, and can encourage industry to accept more responsibility. Federal contracting policies have helped to guide market behavior in other areas, such as promoting “green buildings” through the use of policies that promote the Leadership in Energy and Environmental Design⁴⁴ and Energy Star programs.⁴⁵

[un.org/pages/viewdetails.aspx?src=untsonline&tabid=2&mtdsg_no=xxviii-3&chapter=27&clang=en](http://www.eia.doe.gov/pages/viewdetails.aspx?src=untsonline&tabid=2&mtdsg_no=xxviii-3&chapter=27&clang=en) (last visited Dec. 30, 2011).

38. Press Release, EPA, EPA Awards Grant to Help Reduce E-waste / Furthers Agency Commitment to Responsible Electronic Stewardship (May 2, 2011), <http://yosemite.epa.gov/opa/admpress.nsf/0/5E4CA658ABF536D88525788400472EEE>.

39. Press Release, Comm’n for Env’tl. Cooperation, Ministerial Statement: Seventeenth Regular Session of the CEC Council (Aug. 17, 2010), <http://www.cec.org/Page.asp?PageID=122&ContentID=2969>.

40. *Workshop on Combating Illegal Hazardous Waste Trade Through Seaports*, INT’L NETWORK FOR ENVTL. COMPLIANCE & ENFORCEMENT, <http://www.inece.org/seaport/acra/index.html> (last visited Dec. 30, 2011).

41. *2nd SESN Workshop on Combating the Illegal Trade in Hazardous Wastes Through Seaports*, INT’L NETWORK FOR ENVTL. COMPLIANCE & ENFORCEMENT, <http://www.inece.org/seaport/cambodia/index.html> (last visited Dec. 30, 2011).

42. *Background of the Interpol Global E-waste Crime Group*, INTERPOL, <https://www.interpol.int/Public/EnvironmentalCrime/Meetings/Ewaste2010/Background.asp> (last updated Sept. 17, 2010); *Cleaning Up Electronic Waste*, EPA, <http://epa.gov/oia/toxics/ewaste.html> (last updated Dec. 19, 2011).

43. The United States only collects limited information, for example, on the export of CRTs. See *infra* note 48 and accompanying text.

44. *Public Policies Adopting or Referencing LEED*, U.S. GREEN BLDG. COUNCIL, <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1852> (last updated Dec. 20, 2011).

45. EPA, FEDERAL, STATE, AND LOCAL GOVERNMENTS LEVERAGING ENERGY STAR (2011), http://www.energystar.gov/ia/business/government/State_Local_Govts_Leveraging_ES.pdf.

The *National Strategy* also recognizes the need to update regulations governing CRTs.⁴⁶ Under current regulations, companies intending to export used CRTs (whether broken or intact) for recycling must notify EPA sixty days before export and receive consent for the shipments from the importing country.⁴⁷ In contrast, companies exporting used, intact CRTs for reuse only (as opposed to recycling) need only provide EPA with a one-time notification and are not required to receive consent for the shipments from the importing country.⁴⁸ Thus, the CRT notice and prior-consent requirements depend on the condition of the CRTs (i.e., broken versus intact) and intended use in the receiving country—facts that may not be readily available to a border inspector in the exporting or importing country. This allows unscrupulous recyclers to avoid notice and consent requirements, for example, by simply claiming to export intact CRTs for reuse.⁴⁹

Ratification of the Basel Convention would be an important step in integrating the United States into the global e-waste framework. To date, more than 170 countries have accepted, approved, formally confirmed, ratified, or acceded to the Convention, or have become bound to the Convention through succession.⁵⁰ The U.S. has never completed any of these acts, and has instead only signed the Convention.⁵¹ Because the contracting parties of the Basel Convention have been collaboratively addressing the hazards associated with e-waste,⁵² the United States risks becoming increasingly isolated in the global e-waste debate by working apart from this international agreement.

Another important step the United States could take would be to increase efforts to work with other countries to improve the intelligence-led enforcement of e-waste laws. This would help establish an international e-waste trading system in which market actors are more likely to comply with the domestic laws of the exporting, transit, and importing countries.⁵³ Such a program would promote market integrity and help ensure that companies that break the law do not put those that follow the rules at a competitive disadvantage.

IV. Shortcomings in the National Strategy

The *National Strategy* does not go far enough because the initiatives outlined will not be adequate to address effectively the problem of e-waste exports, which are not adequately reg-

ulated by extant federal law.⁵⁴ Calling for the implementation of the Basel Convention is a good start, but a national strategy should also lay the groundwork for addressing specific issues associated with U.S. e-waste exports, such as the types of e-waste exports the United States should allow without the consent of the receiving country, and whether the United States should restrict the exports of e-waste to developing countries.

A. What the National Strategy Regulates

The *National Strategy* does not go far enough in laying out a path for addressing the issue of which e-waste exports the United States should regulate. In the United States, unlike other developed countries, electronic items sent for recycling are generally not considered hazardous wastes, and therefore not subject to hazardous-waste export requirements under the Resource Conservation and Recovery Act (“RCRA”).⁵⁵ This approach differs markedly from the approach of Canada, for example, which is a party to the Basel Convention.⁵⁶ The Basel Convention covers listed and characteristic wastes, and those wastes covered by the domestic legislation of the party of export, import, or transit.⁵⁷

In the United States, for a material to be considered a RCRA-regulated hazardous waste, it must first meet the definition of a solid waste.⁵⁸ If it meets the definition of a solid waste, it must then meet the definition of a hazardous waste either by exhibiting hazardous characteristics such as ignitability, reactivity, corrosivity, or toxicity, or by appearing on one of four hazardous-waste lists.⁵⁹ Most e-waste destined for recycling does not meet the definition of solid waste,⁶⁰ is excluded from the definition of solid waste,⁶¹ or is exempt from the regulatory requirements of a hazardous waste.⁶² The practical effect of these regulations is that used CRTs sent for recycling are the only common e-waste exports regulated by the United States.⁶³

46. INTERAGENCY TASK FORCE ON ELECS. STEWARDSHIP, *supra* note 6, at 29.

47. 40 C.F.R. § 261.39(a)(5) (2011); 40 C.F.R. § 261.40 (2011).

48. *Id.* § 261.41(a).

49. *See id.* § 261.41(a).

50. Status of Basel Convention, *supra* note 37.

51. *See id.*

52. *See, e.g.*, Press Release, United Nations Env’t Programme, *supra* note 9.

53. Intelligence-led enforcement differs from more traditional enforcement activities by implementing processes to gather and analyze information from a variety of sources, as opposed to relying on citizen complaints and government inspections. An intelligence-based approach requires government analysts to understand the e-waste business inside and out, and work in cooperation with other countries to identify and address illegal shipments. For an overview of intelligence-led policing, see MARILYN PETERSON, U.S. DEP’T OF JUSTICE, INTELLIGENCE-LED POLICING: THE NEW INTELLIGENCE ARCHITECTURE (2005), available at <https://www.ncjrs.gov/pdffiles1/bja/210681.pdf>.

54. *See* JIM PUCKETT ET AL., BASEL ACTION NETWORK & SILICON VALLEY TOXICS COAL., *supra* note 1, at 3 (“The U.S. government policies appear to be *designed* to promote sweeping the E-waste problem out the Asian back door. . . . [I]n fact, the United States government has intentionally exempted E-wastes, within the Resource Conservation and Recovery Act, from the minimal laws that do exist . . .”).

55. Solid Waste Disposal Act, 42 U.S.C. §§ 6901–6992k (2006); *see infra* note 59 (defining hazardous wastes under RCRA).

56. *See infra* notes 81–82.

57. Basel Convention, *supra* note 37, art. 1.

58. 40 C.F.R. § 261 (2011).

59. Under RCRA, hazardous wastes are defined as characteristic wastes (i.e., materials known or tested to exhibit ignitability reactivity, corrosivity, and/or toxicity) or listed wastes (i.e., identified on one of the four hazardous waste lists: F-list, K-list, P-list, or U-list). 40 C.F.R. § 261.3(a)(2)(i)–(ii); *see also id.* §§ 261.21–24, .31–.33.

60. A solid waste is defined as a “discarded material.” *Id.* § 261.2(a)(1). A discarded material is any material which is abandoned, *id.* § 261.2(a)(2)(i)(A), recycled under circumstances which involved disposal on land, burned for energy recovery, or certain reclaimed materials, or accumulated speculatively, *id.* § 261.2(a)(2)(i)(B), (c), considered inherently waste-like, *id.* § 261.2(a)(2)(i)(C), (d), or certain military munitions, *id.* § 261.2(a)(2)(i)(D).

61. *See infra* notes 64–66, 72.

62. *See infra* notes 62, 73.

63. U.S. GOV’T ACCOUNTABILITY OFFICE, *supra* note 26, at 6.

Under RCRA, whole electronic products sent for recycling do not meet the definition of a solid waste.⁶⁴ Items being recycled such as processed scrap metal⁶⁵ and shredded circuit boards that are containerized (i.e., fiberpaks) prior to recovery and that do not contain mercury switches, mercury relays, nickel–cadmium batteries, or lithium batteries⁶⁶ are excluded from the definition of solid waste. Household wastes including electronic wastes,⁶⁷ scrap metals,⁶⁸ whole circuit boards,⁶⁹ and precious metals⁷⁰ being recycled are considered wastes but not subject to most of the regulatory requirements of a hazardous waste, including the hazardous-waste export requirements discussed below.⁷¹ Used CRTs exported for recycling are conditionally excluded from the definition of solid waste if the person notifies EPA of the shipment and receives the consent of the importing country.⁷²

The general purpose of these RCRA exemptions and exclusions is to promote the recycling of wastes that might otherwise be characterized or listed as a hazardous waste under RCRA by loosening the regulatory burden on these wastes.⁷³ Its effect, however, is to allow companies in the United States to export e-waste abroad with few regulatory controls.

In most countries of the world, including the United States, exporting hazardous waste requires the approval of the exporting and importing country, and triggers manifesting and paperwork requirements, all of which allow countries to better monitor and track legal trade and identify illegal trade.⁷⁴

In the United States, however, because most e-waste either is not considered a hazardous waste, or is given special exclusions and exemptions, RCRA's hazardous-waste export regulations do not apply.⁷⁵ These regulations require that, before a shipment proceeds, the exporter must submit to EPA a notification of intent to export, which describes the type and amount of waste, its itinerary, the number of shipments expected, the frequency or rate of export, and the duration of export.⁷⁶ The U.S. exporter may not allow a shipment to proceed unless EPA has notified it of the consent of the importing country and any transit country.⁷⁷ The exporter must attach the uniform hazardous-waste manifest to the shipment papers, the acknowledgment of consent from the importing and transit countries,⁷⁸ and certain additional

information in situations in which the shipment involves OECD countries.⁷⁹ Finally, an exporter must file an annual report with EPA that summarizes the exporter's shipments for the previous calendar year.⁸⁰

Comparing the approach of Canada to that of the United States illustrates the divide that exists between the United States and the rest of the world in how it approaches classifying e-waste for export purposes. Canada does not have the types of exemptions and exclusions that exist in the United States for determining which types of e-waste are hazardous, and as a consequence, Canada requires notice, consent, and manifesting for a much wider array of e-waste exports.⁸¹ In Canada, regulations governing the import and export of hazardous waste and hazardous recyclable materials cover materials that are intended to be disposed of or recycled if they are (1) listed materials, including materials that are not designated as hazardous domestically in Canada but are for the purposes of transboundary movements in order for Canada to implement its international obligations; (2) materials that exhibit certain characteristics such as flammability, explosivity, corrosivity, or are toxic or infectious; (3) materials that may have hazardous constituents that migrate or leach from the waste into the environment and pose hazards to human health and the environment; and (4) materials that are considered or defined as hazardous under the legislation of the receiving country, if the receiving country has also prohibited the waste's import or transit and has notified Canada under procedures set forth in the Basel Convention.⁸²

In order to test whether an e-waste has hazardous constituents that may migrate into the environment, the regulations mandate the use of EPA's toxicity characteristic leaching procedure, which is used to determine whether a solid waste is regulated as a hazardous waste.⁸³ Under this test, a waste would fail—and be regulated as hazardous waste—if the leachate from the test exceeded specified levels of a toxic contaminant.⁸⁴ Electronic products that routinely fail this test include CRTs, circuit boards, laptop computers, computer mice, TV remote controls, cellular phones, and smoke detectors.⁸⁵

An important obstacle to controlling e-waste exports is the potential practice of some companies of avoiding notice

64. 40 C.F.R. § 261.20.

65. *Id.* § 261.4(a)(13).

66. *Id.*

67. *Id.* § 261.4(a)(13).

68. *Id.* § 261.6(a)(3)(ii).

69. The scrap-metal exemption in 40 CFR § 261.6(a)(3)(ii) applies to whole circuit boards with minimal relays, switches, or batteries when provided with protective packaging. Land Disposal Restrictions Phase IV, 63 Fed. Reg. 28,629, 28,630 (May 26, 1998).

70. 40 C.F.R. § 261.6(a)(2)(iii).

71. See *infra* notes 76–80.

72. 40 C.F.R. § (a)(22).

73. *Hazardous Waste Recycling Regulations*, EPA, <http://www.epa.gov/osw/hazard/recycling/regulations.htm> (last updated July 27, 2011).

74. This comes out of the concept of prior informed consent, which is contained in the Basel Convention. See Basel Convention, *supra* note 37, art. 6. For EPA's regulatory requirements, see *infra* notes 76–80.

75. 40 C.F.R. §§ 262.50–58, .80–89.

76. *Id.* § 262.53.

77. *Id.* § 262.52(b).

78. *Id.* § 262.52(c).

79. *Id.* § 262.80–89.

80. *Id.* § 262.56.

81. See Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations, §§1, 2, 7, 8, 9(f)–(g), (p), 11(4), SOR/2005-149 (Can.).

82. *Guide to Classification*, ENV'T CAN., <http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=A8D9E099-1&offset=3&toc=show#3.2> (last updated May 20, 2010).

83. *Id.* (“[EPA method 1311, [toxicity characteristic leaching procedure], July 1992, is used as a measure of the availability and mobility of these hazardous constituents to migrate from the waste into the environment, where they pose a hazard to human health and the environment.”)

84. *Id.*

85. NEB. DEPT OF ENVTL. QUALITY, PUB. NO. 09-004, ENVIRONMENTAL GUIDANCE DOCUMENT: WASTE COMPUTERS, MONITORS, AND ELECTRONICS 11 (2009), available at [http://www.deq.state.ne.us/Publications/07e509939eaf34bf862568ff00534b0b/\\$FILE/09-004.pdf](http://www.deq.state.ne.us/Publications/07e509939eaf34bf862568ff00534b0b/$FILE/09-004.pdf); see also TIMOTHY G. TOWNSEND ET AL., UNIV. OF FLA., RCRA TOXICITY CHARACTERIZATION OF COMPUTER CPUs AND OTHER DISCARDED ELECTRONIC DEVICES (2004), available at <http://www.ees.ufl.edu/homepp/townsend/Research/ElectronicLeaching/UF%20EWaste%20TC%20Report%20July%2004%20v1.pdf>.

and consent requirements by declaring broken or unusable electronics to be in working condition and sold for reuse. Canada is moving to tighten its regulations to cover electronics exported for reuse. These regulations would require companies that export CRTs, circuit boards, lamps, and whole computer parts (e.g., central processing units, monitors, printers, and keyboards) to notify Environment Canada, obtain the consent of the receiving country, and carry proof that the products are functional if they are intended for reuse.⁸⁶ The changes in these regulations are an attempt to prevent such practices.⁸⁷

B. Export Restrictions to Developing Countries

The *National Strategy* also does not go far enough in laying out a path for addressing what restrictions, if any, the United States should place on e-waste exports to developing countries. The U.S. approach to e-waste exports has effectively limited the recycling and disposal costs imposed on the electronic industry and American consumers by allowing these groups to push those costs onto “developing countries where labor is so cheap and environmental laws are often lax.”⁸⁸ Critics of this policy complain that the *National Strategy* will “do nothing to stop exporting e-waste to developing countries (even though most of those exports are illegal),” and as a consequence “will end up stifling U.S. recycling job growth.”⁸⁹ They also point out that arguments that e-waste exports provide poor countries with development opportunities⁹⁰ have been undermined by the damage that this trade is causing to these countries.⁹¹

At issue is whether the United States should adopt what is commonly referred to as the Basel Ban. In 1995, the Basel Convention adopted the Basel Ban Amendment to forbid all exports of hazardous waste and hazardous recyclables from the twenty-nine wealthiest and most influential OECD countries and Liechtenstein, to non-OECD countries.⁹² Seventy countries have ratified the Basel Ban.⁹³ Only seventeen more countries need to ratify the Ban for it to take effect.⁹⁴

Although not enough countries have signed the Ban for it to come into force, many countries, including those in Europe, implement its provisions domestically.⁹⁵

The *National Strategy* should have more strongly endorsed the principle that U.S. companies should not be exporting wastes to countries that cannot manage it in an environmentally sound manner. Fortunately, several recent actions suggest a significant attitudinal shift in the laissez-faire approach by many in the United States toward e-waste exports. The Responsible Electronics Recycling Act,⁹⁶ for example, was introduced in 2011 with bipartisan support in both the House and the Senate with additional support from manufacturers and retailers such as Hewlett-Packard, Dell, Apple, Samsung, and Best Buy, as well as the Electronics TakeBack Coalition, a national environmental coalition.⁹⁷ This bill would prohibit companies from sending electronic equipment considered to be toxic waste to non-OECD countries, and would also require importing countries to give their consent to receive shipments of other types of e-waste considered nontoxic.⁹⁸

In addition, many companies are lining up to support the e-Stewards Certification Program, which requires compliance with existing international hazardous-waste treaties covering electronics export and import.⁹⁹ It also specifically prohibits the export of hazardous waste from developed to developing countries.¹⁰⁰ Companies signing on to the e-Stewards program include LG Electronics,¹⁰¹ Electronics Recyclers International,¹⁰² Alcoa, Samsung, Bank of America, Capital One, and Wells Fargo.¹⁰³ Several countries have recently passed ordinances or policies requiring the use of e-Stewards certified recyclers, including Santa Clara County in Silicon Valley, California, and King County, Washington (which includes Seattle).¹⁰⁴

DEV. (Oct. 25, 2011), <http://www.uncsd2012.org/rio20/index.php?page=iev&nr=511&type=230&menu=39>.

95. See Council Regulation (EEC) 259/93, *supra* note 21.

96. H.R. 2284, 112th Cong. (2011).

97. Press Release, Representatives Gene Green & Mike Thompson, Reps. Green and Thompson Introduce Electronic Waste Recycling Bill (June 23, 2011), <http://green.house.gov/press-release/rep-green-and-thompson-introduce-electronic-waste-recycling-bill>.

98. H.R. 2284 § 3024(a), (e)(1), (h)(2)(A)(i).

99. See *Current e-Stewards Enterprises*, E-STEWARDS, <http://e-stewards.org/recycle-responsibly/enterprises/current-e-stewards-enterprises/> (last visited Dec. 31, 2011); *E-Stewards Compared to Other Standards*, E-STEWARDS, <http://e-stewards.org/certification-overview/> (last visited Dec. 31, 2011) (providing a perspective on why the e-Stewards standard is protective to the environment and workers' health and safety).

100. See *E-Stewards Compared to Other Standards*, *supra* note 99.

101. *LG Electronics Commits to Using the Most Responsible e-Waste Solution Worldwide*, BASEL ACTION NETWORK (July 20, 2011), http://ban.org/ban_news/2011/112607_lg_electronics_commits_to_using_the_most_responsible_e_waste_solution_worldwide.html.

102. Press Release, Basel Action Network, Electronic Recyclers International Achieves the “Gold Standard” e-Stewards(R) Certification for Responsible Electronics Recycling Nationwide (July 7, 2011), <https://app.e2ma.net/app/view:CampaignPublic/id:1400891.7124361498/rid:7cea7bf805692ac66a9981129b736865>.

103. See *Current e-Stewards Enterprises*, *supra* note 99.

104. Jake Thomas, *Local Government Expands e-Stewards Commitment*, RESOURCE RECYCLING (July 1, 2010), <http://www.resource-recycling.com/node/1877>.

86. *Guide to Classification*, *supra* note 82 (discussing proposed legislation to broaden control over export and import of electrical and electronic equipment).

87. ROBERT HEISS ET AL., INTERNATIONAL HAZARDOUS WASTE INSPECTION PROJECT AT SEAPORTS: RESULTS AND RECOMMENDATIONS § 4.3 (2010) (identifying mislabeling of electronic waste as a common problem in illegal waste streams); *The Digital Dump: Exporting Reuse and Abuse in Africa*, BASEL ACTION NETWORK (Oct. 24, 2005), <http://www.ban.org/BANreports/10-24-05/index.htm> (estimating that up to seventy-five percent of used electronics shipped to Lagos, Nigeria are “junk” and without economic value).

88. See, e.g., Grossman, *supra* note 17, at 185.

89. See Barbara Kyle, *Federal Task Force Gets It Wrong on E-waste Exports*, ELECTRONICS TAKEBACK COALITION, (July 22, 2011), <http://www.electronicstakeback.com/2011/07/22/federal-task-force-gets-it-wrong-on-e-waste-exports/>.

90. See generally Eric Williams, *3 Reasons Why a Ban on E-waste Exports Is Wrong*, DISCOVERY NEWS (Aug. 10, 2010), <http://news.discovery.com/tech/three-reasons-ban-on-ewaste-is-wrong.html> (arguing that an export ban will cause negative impacts on vulnerable people in the developing world).

91. See, e.g., AMOYAW-OSEI, *supra* note 4, Sepúlveda, *supra* note 4.

92. *The Basel Convention Ban Amendment*, BASEL CONVENTION, <http://basel.int/pub/baselban.html> (last visited Dec. 31, 2011).

93. For a list of countries that have ratified the ban, see *Ratifications of the Ban Amendment*, BASEL CONVENTION, <http://basel.int/ratif/ban-alpha.htm> (last visited Dec. 31, 2011).

94. *Historic Agreement Ends 15 Year Deadlock over Banning North-South Movements of Hazardous Waste*, RIO+20: UNITED NATIONS CONF. ON SUSTAINABLE

V. Conclusion

The *National Strategy* recognizes that solving the e-waste problem involves several measures. First, manufacturers must design electronics that have longer lifespans and use fewer and less-hazardous materials that are easy to safely recycle.¹⁰⁵ Then, when these products reach the end of their useful lives, they must enter an e-waste trading system that operates in an open and transparent manner.¹⁰⁶ Finally, the products must be recycled and disposed of in a way that protects human health and the environment.¹⁰⁷ The United States will need to undertake further efforts to fully regulate e-waste exports. What the *National Strategy* did not signal, but should have, is whether the United States will take more active control over all of its e-waste exports. Such a strategy would have many environmental and human-health benefits, and would help strengthen our domestic recycling industry.

105. INTERAGENCY TASK FORCE ON ELECS. STEWARDSHIP, *supra* note 6, at 8.

106. *Id.* at 14–16.

107. *Id.* at 23–25.