

A COMPARISON OF E-WASTE EXTENDED PRODUCER RESPONSIBILITY LAWS IN THE EUROPEAN UNION AND CHINA

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INTRODUCTION

Technological advances and economic development have made the world increasingly dependent on electronic devices. Electronics are so ubiquitous, that in 2013 the United Nations estimated that more people have access to cell phones than toilets.¹ This should come as no surprise: 1.75 billion cell phones were sold in 2012,² and cell phones are just one of the myriad of electronics available to consumers. With all these electronics buzzing around, a natural question is: where do they wind up?

The answer depends largely on where the product was discarded. Most electronics discarded in the United States go either to landfills or to China, while most of the electronics discarded in Europe find their way to India, Pakistan, or the west coast of Africa.³ Until recently, the issue for the international community was how to stop the flow of discarded electronics from the developed world to the developing world. The developing world is now facing a new electronic waste issue: domestically consumed electronics. In 2010, the United Nations estimated that sales of electronics would “rise sharply” over the next decade in China, India, and South and

* Robert Reagan holds a J.D. from Vermont Law School and a B.A. from Centre College. He would like to thank the staff of the *Vermont Journal of Environmental Law* for their assistance in editing this article.

1. Yue Wang, *More People Have Cell Phones than Toilets, U.N. Study Shows*, TIME (Mar. 25, 2013), <http://newsfeed.time.com/2013/03/25/more-people-have-cell-phones-than-toilets-u-n-study-shows/> [<http://perma.cc/G58G-ZASC>] (“Out of the world’s estimated 7 billion people, 6 billion have access to mobile phones. Far fewer—only 4.5 billion people—have access to working toilets.”).

2. *Worldwide Mobile Phone Sales Fell in 2012: Gartner*, REUTERS (Feb. 13, 2013), <http://www.reuters.com/article/2013/02/13/us-mobilephones-gartner-idUSBRE91C0G120130213> [<http://perma.cc/6TA2-E46G>].

3. *Where Does E-waste End Up?*, GREENPEACE INT’L (Feb. 24, 2009), <http://www.greenpeace.org/international/en/campaigns/detox/electronics/the-e-waste-problem/where-does-e-waste-end-up/> [<http://perma.cc/YE88-STF4>].

Central America.⁴ This prediction has so far proven accurate: China is second only to the United States in the annual number of electronics sold.⁵

In 2009, China took its first step toward managing the large amount of domestically produced electronic waste (“e-waste”) when the State Council passed the Regulation for the Administration of the Collection and Disposal of Waste Electrical and Electronic Products (“China WEEE”).⁶ China WEEE is an extended producer responsibility law, and it is based on a similar law passed by the European Union in 2003, the Waste Electrical and Electronic Equipment Directive (“WEEE Directive”). This Article compares the two laws in an effort to recommend changes to China WEEE. Part I of this Article outlines the e-waste problem generally and in China particularly. Part II introduces the concept of extended producer responsibility and identifies four elements necessary for successful implementation of extended producer responsibility e-waste laws. Part III compares the key provisions of the WEEE Directive and China WEEE. Part IV recommends changes aimed at improving China WEEE.

I. E-WASTE EVERYWHERE

A. *The Numbers*

Tremendous amounts of electronics are sold every year. In 2012, more than 341 million computers, 119.5 million tablets, 238.5 million televisions, and 1.75 billion cell phones were sold worldwide.⁷ Increasingly, electronics are designed to have short life spans,⁸ which keep replacement rates high.⁹

4. *Urgent Need to Prepare Developing Countries for Surge in E-Wastes*, U.N. UNIV. INST. FOR SUSTAINABILITY & PEACE (Feb. 22, 2010), http://isp.unu.edu/news/2010/urgent_need_to_prepare_developing_countries_for_surge_in_e-wastes.html [<http://perma.cc/2U5X-6V4W>].

5. *Id.*

6. Feiqi dianqi dianzi chanpin huishou chuli guanli tiaoli (废弃电器电子产品回收处理管理条例) [Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products] (promulgated by State Council, Feb. 25, 2009, effective Jan. 1, 2011) (China), available at <http://www.asianjudges.org/wp-content/uploads/2014/03/Regulation-on-the-Administration-of-the-Recovery-and-Disposal-of-Waste-Electrical-and-Electronic-Products.pdf> [<http://perma.cc/G4Q5-YFXN>].

7. ELECTRONICS TAKE BACK COALITION, FACTS AND FIGURES 4 (June 25, 2014), available at http://www.electronicstakeback.com/wp-content/uploads/Facts_and_Figures_on_EWaste_and_Recycling.pdf [<http://perma.cc/F9N2-YLGP>].

8. See Victor H., *Americans Replace Their Cell Phones Every 2 Years, Finns: Every Six, a Study Claims*, PHONEARENA.COM (July 11, 2011), http://www.phonearena.com/news/Americans-replace-their-cell-phones-every-2-years-Finns-every-six-a-study-claims_id20255 [<http://perma.cc/W2FS-VG3Y>] (finding that the average American replaces his or her cell phone every 21.7 months); Sam Grobart, *A Bonanza in TV Sales Fades Away*, N.Y. TIMES (Jan. 5, 2011), http://www.nytimes.com/2011/01/06/technology/06sets.html?_r=0 [<http://perma.cc/5994-Z5T4>].

The combination of high replacement rates and high annual sales translates to large numbers of obsolete electronics. In 2009, global generation of e-waste exceeded fifty-three million tons.¹⁰

Most of the fifty-three million tons of e-waste found its way to China. Each year, some seventy percent of all e-waste is shipped to China.¹¹ There, e-waste is dismantled and recycled in a manner that degrades the environment and harms human health.¹² For China, domestic demand only exacerbates this problem. China's Ministry of Industry and Information estimated that there were 747.4 million cell phones, 220 million computers, and 560 million television sets used in China in 2009.¹³ In 2010, China produced some 2.3 million tons of e-waste, second only to the United States, which produced around three million tons.¹⁴

B. Guiyu, China

Most of the electronics exported to China end up in Guiyu, China, the "e-waste capital of the world."¹⁵ There, over 150,000 migrants work sixteen-hour days, harvesting valuable materials from discarded electronics.¹⁶ While primitive, e-waste recovery in Guiyu is remarkably organized. The work is completed in small-scale, family-run workshops that specialize in discrete tasks.¹⁷

9. See ELECTRONICS TAKE BACK COALITION, *supra* note 7, at 4 (finding that sales of consumer electronics in 2013 exceeded sales in 2012 in tablets, "ultra mobile" computers, and cell phones, and were still high in overall PC sales).

10. Aidan Lewis, *Europe Breaking Electronic Waste Export Ban*, BBC NEWS (Aug. 4, 2010), <http://www.bbc.co.uk/news/world-europe-10846395> [<http://perma.cc/4CCD-3JPR>].

11. 70% of Annual Global E-Waste Dumped in China, CHINA.ORG.CN. (May 24, 2012), http://www.china.org.cn/environment/2012-05/24/content_25461996.htm [<http://perma.cc/7GRP-7WLH>]; Bryan Walsh, *E-Waste Not: How—and Why—we Should Make Sure Our Old Cell Phones, TVs and PCs Get Dismantled Properly*, TIME (Jan. 8, 2009), <http://content.time.com/time/magazine/article/0,9171,1870485,00.html> [<http://perma.cc/B369-H7AT>]; see GREENPEACE INT'L *supra* note 3 (estimating that fifty to eighty percent of e-waste in the United States is exported to countries like China).

12. See *infra* Part I.C.

13. SARAH BROOKS ET AL., ADDRESSING E-WASTE IN CHINA: UNDERSTANDING THE ROLE OF THE CHINESE GOVERNMENT AND CIVIL SOCIETY THROUGH ADVOCACY 4 (2011), available at <http://sites.fordschool.umich.edu/china-policy/files/2012/09/China-E-waste-FINAL.pdf> [<http://perma.cc/56DM-RDSQ>].

14. U.N. UNIV. INST. FOR SUSTAINABILITY & PEACE, *supra* note 4.

15. *Electronic Waste Dump of the World*, SOMETIMES INTERESTING (July 17, 2011), <http://sometimes-interesting.com/2011/07/17/electronic-waste-dump-of-the-world/> [<http://perma.cc/F3VK-HF49>].

16. *Id.*

17. Xia Huo, et al., *Elevated Blood Lead Levels of Children in Guiyu, an Electronic Waste Recycling Town in China*, ENVTL. HEALTH PERSP. (Mar. 28, 2007), <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1913570> [<http://perma.cc/H29L-CWWG>].

While workers employ a variety of methods to dismantle the e-waste, there are some common techniques and themes. For instance, much of the work is conducted in open-air workshops. In some workshops, workers use hammers, screwdrivers, and occasionally electric drills to dismantle e-waste, which is then sold for re-use or to other workshops that specialize in other tasks.¹⁸ In the other workshops, laborers place circuit boards, computers, and other appliances over hot plates or fires to melt and recover solder and other materials.¹⁹ Additional materials are recovered by soaking microchips, circuit boards, and other components in acid, which is then discharged into nearby streams.²⁰ In some workshops, families strip or burn wires and cables to separate the metal and plastic.²¹ In still other workshops, workers rip apart printer cartridges to access toner, aluminum, steel, and plastic.²² Any spare plastic is sorted by rigidity, color, or shine. Plastic that cannot be separated by look or feel is burned and classified according to odor and the color of the flame.²³ Workshops then shred the sorted plastic, which is placed on vibrating platforms and washed to separate heavier metals from lighter metals and plastics.²⁴ Unsurprisingly, the water used in this process contains high levels of toxic, suspended solids, and is discharged without treatment or re-use.²⁵

Much of the e-waste recovery in Guiyu is performed in the Beilin area of Guiyu. The work is turning Guiyu into a toxic dump. Soil and dust samples from workshops revealed dangerous levels of toxic metals²⁶ and various organochlorides.²⁷ Samples from workers' homes showed high levels of toxic metals and organochlorides, suggesting that workers carry the metals and organochlorides home.²⁸ Streams running alongside acid workshops were highly acidic and showed elevated levels of brominated

18. *Id.*

19. *Id.*

20. *Id.*

21. *Id.*

22. *Id.*

23. *Id.*

24. GREENPEACE, RECYCLING OF ELECTRONIC WASTES IN CHINA & INDIA 11 (2005), available at <http://www.greenpeace.org/international/Global/international/planet-2/report/2005/10/recyclingelectronicwasteindiachinafull.pdf> [http://perma.cc/RF48-ZWD6].

25. *Id.*

26. *See id.* at 19, 22 (finding dust and soil samples from shredders showed high levels of antimony, cadmium, and copper).

27. A. Walters & D. Santillo, *Evidence of Environmental and Health Impacts of Electronics Recycling in China: An Update*, GREENPEACE 6 (2008), <http://www.greenpeace.to/publications/impacts-of-e-recycling-china-update.pdf> [http://perma.cc/PE2H-ZML9].

28. *Id.* at 4; GREENPEACE, *supra* note 24, at 33.

flame retardants, phthalates, and various metals, including: antimony, cadmium, copper, mercury, and nickel.²⁹

Not surprisingly, people living in Guiyu have elevated levels of lead and other toxins in their systems. A study conducted by Environmental Health Perspectives compared the blood lead levels (“BLLs”) of 165 children under six years of age in Guiyu, China with those of children under six in Chendian, China. Neither the children in Guiyu nor Chendian worked with e-waste.³⁰ However, the average BLL of a child in Guiyu was 15.3 micrograms of lead per deciliter ($\mu\text{g}/\text{dL}$) of blood, whereas the average in Chendian was $9.94 \mu\text{g}/\text{dL}$.³¹ The United States Centers for Disease Control and Prevention defines elevated BLLs in children under six as those in excess of $5 \mu\text{g}/\text{dL}$ of blood.³² Lead’s impact on development is well known, and studies have demonstrated deleterious effects on child development at even lower levels.³³ The Environmental Health Perspectives study concluded that processing e-waste caused the elevated levels of lead.³⁴

C. Loss of Resources

In addition to the human health and environmental contamination associated with improper recycling of e-waste, improper recovery raises another significant concern: the loss of valuable resources. Electronics contain several valuable and rare metals, many of which are lost due to improper recovery. For example, every year 320 tons of gold and 7,500 tons silver—or twenty-one billion dollars, the GDP of El Salvador—are placed into cell phones, computers, televisions, tablets, and electronic devices.³⁵ Less than fifteen percent of these metals are recovered.³⁶

29. See GREENPEACE, *supra* note 24, at 42 (explaining that river samples downstream of acid workshops contained between ten and thirty times the amount of dissolved metal than samples upstream from acid workshops).

30. Xia Huo et al., *supra* note 17.

31. *Id.* (Samples were taken from four areas in Guiyu: Beilin, Dutou, Huamei, and Loggang. The BLL range was 4.40 to 32.67 $\mu\text{g}/\text{dL}$. Children in Beilin—where most of the e-waste recycling takes place—had the highest average BLL of all the areas tested: 19.34 $\mu\text{g}/\text{dL}$).

32. *What Do Parents Need to Know to Protect Their Children?*, CTRS. FOR DISEASE CONTROL & PREVENTION, http://www.cdc.gov/nceh/lead/acclpp/blood_lead_levels.htm [<http://perma.cc/HDD7-5FXE>] (last updated June 19, 2014).

33. *Id.*

34. *Id.*

35. *E-waste: Annual Gold, Silver “Deposits” in New High-Tech Goods Worth \$21 Billion+; Less than 15% Recovered*, UNITED NATIONS UNIV. (July 9, 2012), <http://unu.edu/media-relations/releases/step-news-release-6-july-2012-e-waste-precious-metals-recovery.html> [<http://perma.cc/D9J9-3UQP>].

36. *Id.*

Limited recovery requires procurement of new resources, which means more mining. Mining is fiscally and environmentally costly because most of the metals required to produce electronics are extracted from expansive, open pit mines.³⁷ One mine in Arizona, for instance, stretches two miles by three-quarters of a mile.³⁸ Moreover, accessing metals in these mines necessitates large quantities of waste rock. In some mines, more than ten tons of waste rock is required to produce one ounce of gold.³⁹

Moving excess rock and processing the ores is also energy intensive. Moving the waste rock alone consumes between seven and ten percent of the world's energy production.⁴⁰ Once the waste rock is removed and the ore isolated, the ore must be processed. Separating the metal from the ore generates numerous toxins, such as sulfur dioxide, nitrogen oxides, and lead.⁴¹ Many of these toxins end up contaminating streams and groundwater.⁴² Mining releases more toxins into the environment than any other industry in the United States, and improper disposal prevents the recovery of these costs.⁴³

II. EXTENDED PRODUCER RESPONSIBILITY

A. *EPR Theory*

Extended producer responsibility has been trumpeted as a possible solution to all of issues listed above. The term and concept of extended producer responsibility (“EPR”) is relatively new. EPR as a concept and term was first used in 1990 by Thomas Lindhqvist in a report for the Swedish Ministry of Environmental and Natural Resources.⁴⁴ Lindhqvist defines EPR as:

37. ELIZABETH GROSSMAN, *HIGH TECH TRASH: DIGITAL DEVICES, HIDDEN TOXICS, AND HUMAN HEALTH* 25, 27 (2006).

38. *Id.* at 27.

39. Lauren Kritzer, *Open Pit Gold Mine*, YOUTUBE (Dec. 10, 2011), https://www.youtube.com/watch?v=S16q_x8TUo0 [<https://perma.cc/8CUH-ZXC3>]. Other metals generate similarly large quantities of waste rock. For instance, two pounds of copper generate 620 pounds of waste rock. The 200 million computers built in 2005 generated 124 billion pounds of waste rock. *See* GROSSMAN, *supra* note 37, at 27.

40. GROSSMAN, *supra* note 37, at 25.

41. *Id.*

42. *Id.* at 26–27.

43. *Id.* at 25, 31.

44. Thomas Lindhqvist, *Extended Producer Responsibility in Cleaner Production: Policy Principle to Promote Environmental Improvements of Product Systems ii* (May 2000) (Doctoral Dissertation, Lund University), *available at* <http://www.lub.lu.se/luft/diss/tec355.pdf> [<http://perma.cc/3QYH-JYHZ>].

[A] policy principle to promote total life cycle environmental improvements of product systems by extending the responsibilities of the manufacturer of the product to various parts of the entire life cycle of the product, and especially to the take-back, recycling[,] and final disposal of the product.⁴⁵

EPR is an extension of both the polluter pays principle and take-back programs.⁴⁶ By combining these principles, EPR seeks to hold producers accountable for the negative effects of their products by making them financially responsible for the costs associated with recovery and recycling. While assigning recovery responsibilities to producers is a significant departure from the notion that municipalities should be responsible for waste disposal, “there is no obvious reason why government should manage waste instead of industry.”⁴⁷ Shifting management of waste from the people to the producers creates a natural incentive for producers to reduce waste, an incentive not present when the cost of waste management is borne by the people.⁴⁸

The theory of EPR is particularly attractive to those concerned about e-waste for at least three reasons. First, as discussed above, electronics contain a bevy of toxic material that is harmful to man and the environment if not treated properly. Second, improper disposal results in the loss of valuable resources and the inputs required to procure such resources.⁴⁹ Finally, proper and efficient recycling of electronics is closely tied to

45. *Id.* at v.

46. This Article refers to EPR as if it were a single waste management theory. In reality, EPR is an umbrella term for several types of laws that extend producer responsibility. Some types of EPR include: (1) financial responsibility EPR, which requires producers to pay the full or some part of the cost of collection, recovery, or final disposal; (2) physical responsibility EPR, which requires producers to take responsibility for the physical management of their products; (3) informative responsibility EPR, which requires producers to supply information on their products; (4) liability EPR, which makes producers responsible for environmental damage caused by their products. This Article uses “EPR” to mean wholesale EPR, which makes producers fully responsible for the entire life-cycle of their products. See CHRIS VAN ROSSEM, NAOKO TOJO, THOMAS LUNDHQUIST, EXTENDED PRODUCER RESPONSIBILITY: AN EXAMINATION OF ITS IMPACT ON INNOVATION AND GREENING PRODUCTS 5 (2006), available at <http://www.greenpeace.org/international/PageFiles/24472/epr.pdf> [<http://perma.cc/6TZ4-SE8T>].

47. Noah Sachs, *Planning the Funeral at the Birth: Extended Producer Responsibility in the European Union and the United States*, 30 HARV. ENVTL. L. REV. 51, 63 (2006).

48. *Id.*

49. Hannah G. Elisha, *Addressing the E-Waste Crisis: The Need for Comprehensive Federal E-Waste Regulation Within the United States*, 14 CHAP. L. REV. 195, 231 (2010).

design. Because each new model is built according to a different schematic, each new model requires different recovery techniques.⁵⁰

Where there is a strong correlation between initial product design and recovery, and especially where that correlation extends to materials toxic to man and the environment, the logic of placing responsibility for end-of-life recovery on the producer is particularly strong. This is because placing such responsibility on the producer internalizes costs.⁵¹ Once producers are responsible for end-of-life recovery, the desire to remain competitive creates an incentive to reduce costs.⁵² By forcing producers to recycle their products, EPR creates an incentive to design products that are easier to recycle, to make fewer design changes, and to create products with less lead, cadmium, mercury, and other harmful materials.⁵³ Thus, EPR laws hold the potential to fund recycling programs for e-waste and change the way electronics are manufactured, used, discarded, and recycled. EPR has the potential to make our electronics less harmful to man and the environment. As Lindhqvist states, “allocating full physical and economic responsibilities to manufacturers will encourage a shift towards providing the functions of the products in a more efficient way.”⁵⁴

B. EPR Laws

While EPR laws, in theory, hold the potential to “encourage a shift towards providing the functions of the products in a more efficient way,” they must be carefully designed to be effective. To encourage producers to build more easily recycled products, EPR laws must be able to fully assign the costs of recovery and recycling to producers. To fully assign these costs, EPR laws must contain at least four elements: (1) a strong recovery requirement; (2) meaningful financial responsibility; (3) substantial oversight of recyclers; and (4) robust enforcement provisions.

Several countries have passed electronics EPR laws, including India,⁵⁵ Japan,⁵⁶ South Korea,⁵⁷ and Brazil.⁵⁸ And while there is no federal law in

50. Philipp Bohr, *The Economics of Recycling: New Approaches to Extended Producer Responsibility*, 36 (Sep. 28, 2007) (dissertation for Doctorate of Engineering, Technical University of Berlin).

51. Lindhqvist, *supra* note 44, at 50.

52. *Id.* at ii.

53. *Id.* at 10.

54. *Id.* at vi.

55. Tom Dowdall, *Victory—India Introduces E-Waste Law*, GREENPEACE INT’L (June 10, 2011), <http://www.greenpeace.org/international/en/news/Blogs/makingwaves/victory-india-introduces-e-waste-law/blog/35240/> [<http://perma.cc/RTR2-ALD5>].

56. Sung-Woo Chung et al., *Application of EPR to Recycling Policies in Japan, Korea, and Taiwan*, in *EXTENDED PRODUCER RESPONSIBILITY POLICY IN EAST ASIA: IN CONSIDERATION OF*

the United States extending the responsibility of electronics producers, several states have passed EPR laws, including: Maine, Vermont, New York, New Jersey, Pennsylvania, Michigan, Texas, Washington, and Oregon.⁵⁹ In 2003, the European Union (“EU”) passed the world’s first e-waste EPR law when it enacted the WEEE Directive. The WEEE Directive is considered the “largest, most comprehensive public-to-private transfer of responsibility for e-waste management thus far.”⁶⁰ The WEEE Directive states that its purpose is to:

[C]ontribute to sustainable production and consumption by, as a first priority, the prevention of WEEE and, in addition, by the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste and to contribute to the efficient use of resources and the retrieval of valuable secondary raw materials. It also seeks to improve the environmental performance of all operators involved in the life cycle of EEE, e.g. producers, distributors and consumers and, in particular, those operators directly involved in the collection and treatment of WEEE.⁶¹

The WEEE Directive seeks to accomplish this purpose by requiring Member States to compel electronics producers to recover and recycle e-waste in an environmentally responsible manner. The WEEE Directive has generally been considered a success in reducing the amount of e-waste that ends up in landfills and reducing the use of virgin materials.⁶² China’s e-

INTERNATIONAL RESOURCE CIRCULATION 13, 14 (Yasuhiko Hotta et al., eds., 2009), available at http://pub.iges.or.jp/modules/envirolib/upload/2607/attach/section2_p011-p072.pdf [<http://perma.cc/Q54G-XE2J>].

57. *Id.*

58. Vanda Scartezin, *Redeeming E-Waste in Brazil*, WASTE MGMT. WORLD, <http://www.waste-management-world.com/articles/print/volume-14/issue-2/features/redeeming-e-waste-in-brazil.html> [<http://perma.cc/QP5V-9TD6>] (last visited Mar. 23, 2015).

59. *See State Legislation*, ELECTRONICS TAKEBACK COALITION, <http://www.electronicstakeback.com/promote-good-laws/state-legislation/> [<http://perma.cc/6HX8-LG7M>] (last visited Mar. 19, 2015) Other states that have passed electronics EPR laws include: Connecticut, Delaware, Maryland, West Virginia, Virginia, North Carolina, South Carolina, Indiana, Illinois, Missouri, Wisconsin, and Oklahoma. *Id.* California has adopted a consumer fee law and Utah has passed a manufacturer education law. In total, 25 states mandate statewide e-waste recycling. An e-waste recycling law covers some sixty-five percent of Americans. *Id.*

60. Holly K. Towle et al., *The European Union Directive on Waste Electrical and Electronic Equipment: A Study in Trans-Atlantic Zealotry*, 31 RUTGERS COMPUTER & TECH. L.J. 49, 54 (2004).

61. Directive 2012/19, of the European Parliament and of the Council of 4 July 2012 on Waste Electrical and Electronic Equipment (WEEE) 2012/19/EU, 2012, O.J. (L 197) 38–39, available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:197:0038:0071:en:PDF> [<http://perma.cc/5YDT-4JZD>].

62. Sachs, *supra* note 47, at 72.

waste EPR law is based on the EU's WEEE Directive.⁶³ And because the WEEE Directive has successfully⁶⁴ imposed comprehensive requirements⁶⁵ on a diverse array of people across a significant geographical range,⁶⁶ it is the natural law to which China's electronics EPR law should be compared. The State Council passed China's electronics EPR law, the Regulation for the Administration of the Collection and Disposal of Waste Electrical and Electronic Products (China WEEE), on February 25, 2009.⁶⁷ The law was passed pursuant to the Clean Production and Solid Waste Laws.⁶⁸ The purpose of China WEEE is to "regulat[e] the recovery and disposal of waste electrical and electronic products, [to] promot[e] the comprehensive resource utilization and the development of [a] circular economy, [to protect] the environment, and [to safeguard] the human health."⁶⁹ While the purpose of China WEEE is similar to the EU's WEEE Directive, Charles McElwee notes that "it bears little resemblance to the EU Directive."⁷⁰ The remainder of this Article will compare the four elements listed above in the WEEE Directive with China WEEE.

III. COMPARISON OF CRITICAL PROVISIONS OF THE WEEE DIRECTIVE & CHINA WEEE

A. Recovery Requirement

To be effective, EPR laws must ensure that producers recover their end-of-life, obsolete products. In the context of electronics, at least three elements are required for successful recovery. First, because electronics are so ubiquitous, an effective recovery requirement must force producers to recover a variety of electronics. Second, the law must make it simple for

63. CHARLES R. MCELWEE, ENVIRONMENTAL LAW IN CHINA: MITIGATING RISK AND ENSURING COMPLIANCE 275 (2011).

64. Sachs, *supra* note 47, at 72.

65. *See id.* at 86 (comparing the United States and Europe and stating that Europe has a comprehensive policy); *see also ERP Celebrates Recycling Success in Ireland on the 6th Birthday of the WEEE Directive*, EUR. RECYCLING PLATFORM (Aug. 12, 2010), <http://www.erp-recycling.ie/index.php?content=399> [<http://perma.cc/T3AJ-C7PE>] (stating the WEEE is the first compliance scheme to have operations in multiple countries).

66. *See* Sachs, *supra* note 47, at 68 (stating that the European EPR program can be "implemented at national and supranational scales" and that the EPR legislation has been adopted in 25 EU member states).

67. Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products (China).

68. MCELWEE, *supra* note 63.

69. Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products (China) art 1.

70. MCELWEE, *supra* note 63.

consumers to dispose of e-waste so that it stays out of the municipal waste stream. Finally, producers must be responsible for collection.

1. Scope

a. WEEE Directive

Article 2 of the WEEE Directive states that the law covers electronics listed in the Annexes.⁷¹ Annex 1 lists the ten basic categories to which the law applies: (1) large household appliances; (2) small household appliances; (3) IT and telecommunications equipment; (4) consumer equipment and photovoltaic panels; (5) lighting equipment; (6) electrical and electronic tools; (7) toys, leisure, and sporting equipment; (8) medical devices; (9) monitoring and control instruments; and (10) automatic dispensers.⁷² Annex 2 further defines the scope of the WEEE Directive by providing numerous example products in each of the ten categories listed in Annex 1.⁷³

b. China WEEE

The scope of China WEEE is substantially less than the WEEE Directive. China WEEE's recovery requirements apply to "waste electrical and electronic products listed in the Catalogue of [W]aste [E]lectrical and Electronic Products for Disposal."⁷⁴ The first Catalogue was released in early 2010 for comments, officially published on September 8, 2010, and approved by the State Council on January 1, 2011.⁷⁵ The Catalogue included five types of products: televisions, refrigerators, washing machines, air conditioners, and computers.⁷⁶

71. Directive on Electrical and Electronic Equipment (WEEE), art. 2.

72. *Id.* annex I.

73. *Id.* annex II (an exhaustive list of products that expands on the categories found in Annex I).

74. Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products, (China) art. 3.

75. MCELWEE, *supra* note 63, at 276; *First Product Catalogue of China WEEE Published*, SGS TAIWAN (Oct. 26, 2010), <http://www.sgs.com.tw/en/Local/Taiwan/News-and-Press-Releases/2010/10/First-Product-Catalogue-of-China-WEEE-Published.aspx> [<http://perma.cc/4HHB-TDZJ>].

76. *First Product Catalogue of China WEEE Published*, *supra* note 75.

2. Collection Responsibilities

a. WEEE Directive

The WEEE Directive provides extensive legislation on collection and recovery of e-waste. Importantly, the Directive imposes collection responsibilities on both the Member States and the distributors. Article 5 requires Member States to “adopt appropriate measures in order to minimise the disposal of WEEE in the form of unsorted municipal waste, to ensure the correct treatment of all collected WEEE and to achieve a high level of separate collection of WEEE.”⁷⁷ For WEEE from private households, Member States must ensure that:

- (a) systems are set up allowing final holders and distributors to return such waste at least free of charge. Member States shall ensure the availability and accessibility of necessary collection facilities, taking into account, in particular, population density;
- (b) when supplying a new product, distributors are responsible for ensuring that such waste can be returned to the distributors at least free of charge on a one-to-one basis as long as the equipment is of equivalent type and has fulfilled the same functions as the supplied equipment . . . ;
- (c) distributors provide for the collection at retail shops with sales areas relating to EEE at least 400 m², or in their immediate proximity, of very small WEEE . . . free of charge to end-users and with no obligation to buy EEE of an equivalent type . . . ;
- (d) without prejudice to points (a), (b), and (c) producers are allowed to set up and operate individual and/or collective take-back systems for WEEE from private households⁷⁸

Member States also must ensure producers, or third parties on their behalf, collect “WEEE other than WEEE from private households.”⁷⁹

Article 8 expands on the collection responsibilities, adding that “Member States shall ensure that producers or third parties acting on their behalf set up systems to provide for the recovery of WEEE using best available techniques.”⁸⁰ Importantly, Article 8 allows producers to recover

77. Directive on Electrical and Electronic Equipment (WEEE), art. 5 ¶ 1.

78. *Id.* ¶ 2(a)–(d).

79. *Id.*

80. *Id.* art. 8 ¶ 3.

WEEE either “individually or collectively.”⁸¹ Once e-waste is separated, the WEEE Directive prohibits it from being disposed of without first undergoing treatment.⁸²

b. China WEEE

Article 11 requires the state to:

[E]ncourage the producers of electrical and electronic products to recover waste electrical and electronic products by themselves or by entrusting distributors, repair institutions, after-sales service institutions or operators dealing in the recovery of waste electrical and electronic products. The distributors, repair institutions and after-sales service institutions of electrical and electronic products shall set up prompts on the recovery and disposal of waste electrical and electronic products in the conspicuous positions of their business premises.⁸³

Recovered waste “shall be disposed of by the disposing enterprises with the qualifications for disposing of waste electrical and electronic products.”⁸⁴

3. Informational Requirements

a. WEEE Directive

In addition to the WEEE Directive’s recovery requirements, the Directive includes informational requirements aimed at improving collection and recovery. Under the WEEE Directive, Members States may, but are not compelled to, require producers to inform customers at the time of purchase of the cost of collection, treatment, and disposal of the product.⁸⁵ Producers must inform users of electronics in private households of several things, including: (1) not to dispose of e-waste in the unsorted municipal waste stream, (2) to dispose of e-waste in an available collection system, (3) the user’s “role in contributing to re-use, recycling and other forms of recover of [e-waste],” and (4) the effects of e-waste on human

81. *Id.*

82. *Id.* art. 6.

83. Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products (China), art. 11.

84. *Id.*

85. Directive on Electrical and Electronic Equipment (WEEE), art. 14 ¶ 1.

health and the environment.⁸⁶ Finally, to discourage individuals from placing their e-waste in the municipal waste stream, the WEEE Directive requires producers to include the following symbol on all electronics.⁸⁷

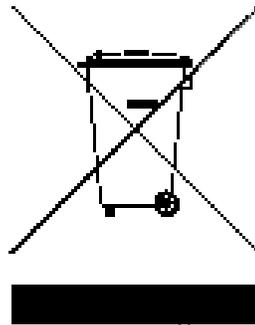


Figure 1⁸⁸

b. China WEEE

China WEEE contains no similar informational requirement. Article 10 comes closest to the WEEE Directive's informational requirement. It states: "[s]uch information as content of relevant toxic or hazardous substances and prompt recovery and disposal shall be stated on the electrical and electronic products or in the third product instructions."⁸⁹

4. Comparison

The WEEE Directive's recovery requirements are much stronger and more detailed than China WEEE's requirements. First, the WEEE Directive applies to a much broader scope of electronics.⁹⁰ Second, the WEEE Directive requires Member States to compel producers to collect their waste, whereas China WEEE merely "encourages" recovery.⁹¹ Third, the WEEE Directive's information requirement goes much further toward keeping e-waste out of the municipal waste stream because it is much more explicit than China WEEE's informational requirement.⁹² The WEEE

86. *Id.* ¶ 2 (a)–(d).

87. *Id.* ¶ 4.

88. *Id.* annex IX.

89. Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products (China), art. 10.

90. Directive on Electrical and Electronic Equipment (WEEE), art. 2.

91. Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products, art. 8.

92. Directive on Electrical and Electronic Equipment (WEEE), art. 5.

Directive's broader scope and more explicit informational requirements go further toward reducing the amount of e-waste that is improperly disposed, a vitally important component of a successful EPR law. Moreover, the WEEE Directive's mandate that producers recover their products is more in line with the theory of EPR.

Therefore, while the WEEE Directive allows producers to form group recovery operations—obscuring the actual costs of recovery—its mandates get closer to establishing a true electronics EPR. Given the extensive recovery requirements in the WEEE Directive, it is no surprise that its Member States have largely met the recovery goals. As a result of its success, in 2012, the EU increased collection targets to require Member States to collect a higher percentage of e-waste.⁹³

B. Financial Responsibility

Clear financing responsibility is critical to a successful electronics EPR law. If an EPR law does not compel producers to pay the full price for the recovery, collection, and disposal of their products, the EPR law will be less effective at incentivizing product redesign. Thus, in analyzing the financial responsibility provisions of the WEEE Directive and China WEEE, it is important to consider whether and to what extent the laws internalize the costs of end-of-life recovery.

1. WEEE Directive

Article 12 and Article 13 contain the WEEE Directive's financing requirements. Article 12 outlines financing for e-waste from private households and Article 13 provides for the financing of e-waste from sources other than private households. Article 12 states that "Member States shall ensure that producers provide at least for the financing of the collection, treatment, recovery and environmentally sound disposal of WEEE from private households."⁹⁴ Under the Directive, Member States must "ensure that each producer provides a guarantee when placing a product on the market showing that the management of all [e-waste] will be

93. *Electronic Waste: EU Adopts New WEEE Law*, BBC NEWS (Jan. 19, 2012), <http://www.bbc.co.uk/news/world-europe-16633940> [<http://perma.cc/ZDB5-T9NW>] (The Directive's new requirements compel Member States to collect forty-five percent of e-waste by 2016 and sixty-five percent by 2019.).

94. Directive on Electrical and Electronic Equipment (WEEE), art.12 ¶ 1.

financed.”⁹⁵ Financing of e-waste from users other than private households must also be borne by the producers.⁹⁶

2. China WEEE

The funding requirement in China WEEE is listed in Article 7. It provides that:

The state shall establish a fund for the disposal of waste electrical and electronic products for the expense for recovering and disposing of waste electrical and electronic products. The producers of electrical and electronic products, the consignees of imported electrical and electronic products and their agents shall, according to the relevant provisions, perform obligation of payment to the fund for the disposal of waste electrical and electronic products.⁹⁷

3. Comparison

The WEEE Directive’s financing provisions are more thorough than China WEEE’s. The Directive’s clear mandate that producers be capable of financing the collection, treatment, recovery, and environmentally sound disposal of e-waste before placing products on the market ensures that electronics producers think about cost of recovery at the design stage, and makes it more likely that funds will be available when the electronics become obsolete.⁹⁸ Further, by requiring that individual producers be financially responsible for their own products, the WEEE Directive guarantees that producers receive the feedback necessary to redesign products to reduce costs.⁹⁹ Thus, the WEEE Directive’s financing provision forces producers to internalize the costs associated with placing electronics on the market.

China WEEE does a poor job of forcing producers to internalize costs, and therefore, falls short on one of the most important components of an EPR law. Because it establishes a fund instead of forcing producers to pay

95. *Id.* ¶ 3.

96. *Id.* art. 13 ¶ 1.

97. Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products (China), art. 7.

98. KNUT SANDER ET. AL., THE PRODUCER RESPONSIBILITY PRINCIPLE OF THE WEEE DIRECTIVE IV (2007), available at http://ec.europa.eu/environment/waste/weee/pdf/final_rep_okopol.pdf [<http://perma.cc/VWC9-JM8W>].

99. CHRIS VAN ROSSEM ET. AL., EXTENDED PRODUCER RESPONSIBILITY: AN EXAMINATION OF ITS IMPACT ON INNOVATION AND GREENING PRODUCTS 5 (2006), available at <http://www.greenpeace.org/international/PageFiles/24472/epr.pdf> [<http://perma.cc/CT2F-XKCS>].

for their products, China WEEE does nothing to provide producers with individual feedback.¹⁰⁰ By failing to provide producers with individual feedback, China WEEE does nothing to incentivize producers to develop products for ease of end-of-life recovery. China WEEE's failure to create producer incentives cannot be overstated because an EPR law's success or failure depends largely on its ability to incentivize design change. But even if the fund did provide feedback and incentivize product redesign, the efficacy of a state-controlled fund is likely to be undermined by corruption.¹⁰¹ Thus, on the whole, China WEEE's funding requirement is inadequate for the purpose of the law.

C. Oversight of Recyclers

Oversight of recyclers is imperative. Without proper oversight, recyclers will dispose of their e-waste in the cheapest possible manner, which usually means sending e-waste to places like Guiyu.¹⁰² Proper oversight is also important to ensure that the recyclers use environmentally sound techniques. Effective EPR laws must (1) have strong permitting requirements that ensure recyclers use best available technology and (2) have strong oversight provisions to prevent recyclers from shipping e-waste to workshops in India, China, and the rest of the developing world.

100. Xin Tong & Lin Yan, *From Legal Transplants to Sustainable Transition: Extended Producer Responsibility in Chinese Waste Electrical and Electronic Equipment Management*, 17 J. INDUS. ECOLOGY 199, 200 (2013).

101. See 2014 Corruption Perceptions Index, TRANSPARENCY INTERNATIONAL, <http://www.transparency.org/cpi2014/results> (last visited May 5, 2015) (ranking China as highly corrupt).

102. See Howard Pankratz, *Colorado Recycling Firm and Two Officers Found Guilty in Export Scheme*, DENV. POST (Dec. 21, 2012), http://www.denverpost.com/breakingnews/ci_22240497/colorado-recycling-firm-and-two-officers-found-guilty [<http://perma.cc/TE3P-4S5G>] (noting that there are countless examples of recycling companies shipping e-waste to the developing world; the case in Colorado is not unique but for the audacity of Executive Recycling's CEO, who secured a government contract to recycle waste based largely on his representations that his company recycled e-waste in compliance with all local, state, and federal laws. The CEO was found guilty on multiple counts of wire and mail fraud and numerous environmental crimes. In addition to fines, the CEO faces up to twenty years in prison); *Following the Trail of Toxic E-Waste*, CBS NEWS (Nov. 8, 2008), <http://www.cbsnews.com/news/following-the-trail-of-toxic-e-waste/> [<http://perma.cc/KZ6G-7DWX>]; Ryan Boldrey, *Recycling Execs File for Appeal*, HERALD RANCH (Jan. 17, 2013), <http://content.time.com/time/photogallery/0,29307,1870162,00.html> [<http://perma.cc/RB7T-3BMF>].

1. WEEE Directive

Member States must “ensure that all separately collected [e-waste] undergoes proper treatment.”¹⁰³ Proper treatment must include the “removal of all fluids and a selective treatment in accordance with Annex VII.”¹⁰⁴ Annex VII contains a detailed list of mixtures and components that must be removed from any e-waste separated from the municipal waste stream.¹⁰⁵ Any entity that treats e-waste must obtain a permit in compliance with Article 23.¹⁰⁶ In addition to other conditions, permits may only be issued to entities capable of meeting the requirements outlined in Annex VII.¹⁰⁷ Article 23 requires Member States to carry out “appropriate inspections and monitoring to verify the proper implementation of th[e] [WEEE] Directive.”¹⁰⁸ Inspections must include “the operations at treatment facilities.”¹⁰⁹ The cost of such inspections may be charged to producers.¹¹⁰

2. China WEEE

China WEEE requires recyclers to:

[O]btain the qualification for disposing of waste electrical and electronic products according to this Regulation; if it fails to obtain the qualification for disposal, it shall deliver the recovered waste electrical and electronic products to a disposing enterprise with the qualification for disposing of waste electrical and electronic products for disposal.¹¹¹

According to Article 23, disposing enterprises must:

- (1) [h]av[e] sound facilities for the disposal of waste electrical and electronic products;
- (2) [h]av[e] a plan for the proper use or disposal of waste electrical and electronic products which cannot be fully disposed of;

103. Directive on Electrical and Electronic Equipment (WEEE), art. 8 ¶ 1.

104. *Id.* ¶ 2.

105. *Id.* annex VII.

106. *Id.* art. 9, ¶ 1 at 47 (referring to article 23 of Directive 2008/98/EC).

107. *Id.* art. 8 ¶ 3.

108. *Id.* art. 23 ¶ 1.

109. *Id.* ¶ 1(c).

110. *Id.* ¶ 3.

111. Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products (China), art. 12.

- (3) [h]av[e] the sorting, packing and other equipment appropriate for the waste electrical and electronic products to be disposed of; and
- (4) [h]av[e] the relevant technical professionals on safety, quality and environmental protection.¹¹²

Recyclers must also “meet the relevant requirements of the state for the comprehensive resource utilization, environmental protection, labor safety and protection of human health.”¹¹³ Recyclers are not allowed to “dispose of waste electrical and electronic products by technologies and processes which have been expressly eliminated by the state.”¹¹⁴

Entities that dispose of electronic waste must “establish a daily environment monitoring system for the disposal of waste electrical and electronic products.”¹¹⁵ These entities must also:

[E]stablish an information management system for data on waste electrical and electronic products, and report the basic data and relevant information on the disposal of waste electrical and electronic products to the competent department of environmental protection of the people’s government of a districted city where it is located. The basic data on the disposal of waste electrical and electronic products shall be kept for a period of not less than three years.¹¹⁶

3. Comparison

China WEEE provides for little oversight of recyclers. Moreover, China WEEE’s qualifications for recyclers are subjective and undefined, leaving recyclers without guidance and the government without objective criteria with which to judge recyclers. Finally, Article 17 seems to impose a self-reporting requirement in place of government inspections. Thus, there seems to be no real mechanism in China WEEE with which to oversee how e-waste is recycled.

In contrast, the WEEE Directive’s permitting requirements are outlined in detail in Annex VII. Prior to receiving a permit, recyclers must complete a variety of tasks to a specified standard. The WEEE Directive requires

112. *Id.* art. 23.

113. *Id.* art. 15.

114. *Id.*

115. *Id.* art. 16.

116. *Id.* art. 17.

Member States to inspect recyclers to verify compliance. These requirements ensure that producers pay the full cost of dismantling products in an environmentally responsible manner.

D. Enforcement

Strong enforcement provisions are important for obvious reasons. Without adequate enforcement measures, recyclers and producers will not comply with the law, and the goals of EPR will not be achieved. A strong enforcement provision must set penalties high enough to make noncompliance more costly than compliance.

1. WEEE Directive

The WEEE Directive requires Member States to penalize violations of the national laws adopted pursuant to the Directive.¹¹⁷ “The penalties provided for must be effective, proportionate and dissuasive.”¹¹⁸ Member States have established heavy penalties for violations. In Germany, are as high as 50,000 Euros per violation; in Italy, up to 100,000 Euros; in Spain, up to 1.2 million Euros; and in Ireland, up to fifteen million Euros and imprisonment up to ten years.¹¹⁹

2. China WEEE

Chapter IV of China WEE covers Legal Liabilities. Article 27 imposes a 50,000 yuan fine on producers for the failure to “state such information as content of toxic or hazardous substances and prompts on recovery and disposal on the produced or imported electrical and electronic products or in the product instructions according to relevant provisions.”¹²⁰ Article 28 provides that the Government can close businesses, “confiscate illegal gains, and impose a fine of not less than 50,000 yuan but not more than 500,000 yuan” for improper disposal of electronic waste.¹²¹ Article 31 states that:

117. Directive on Electrical and Electronic Equipment (WEEE), art. 22.

118. *Id.*

119. *WEEE Directive*, HONG KONG GREEN MFG. ALLIANCE, <http://www.gma.org.hk/questcms/main/main.php?obj=23&page=1&kw=&ii=&ci=&lg=en&theme=default> [<http://perma.cc/3BZD-9RBV>] (last updated Jan. 2007).

120. Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products (China), art. 27.

121. *Id.* art. 28.

Where, in violation of this Regulation, a disposing enterprise fails to establish an information management system for data on waste electrical and electronic products, fails to report the basic data and relevant information according to the relevant provisions, reports false basic data or relevant information, or fails to keep the basic data according to the prescribed period, the competent department of environmental protection of the people's government of a districted city where it is located shall order it to correct within a prescribed time limit, and may impose a fine of not more than 50,000 yuan on it.¹²²

Article 32 imposes the same fine on “disposing enterprises” that either “fail[] to establish a daily environment monitoring system or fails to carry out daily environment monitoring.”¹²³

3. Comparison

China WEEE's penalty provisions are too low to dissuade producers from violating the law. Converted to dollars, the 50,000 to 500,000 yuan penalties range from \$8,093.90 to \$80,939.00.¹²⁴ In 2009, total sales revenue for electronic products sold in China exceeded 5.1305 trillion yuan, or \$751 billion.¹²⁵ Given the sales revenue, it is unlikely that these fines are high enough to dissuade producers from violating the law because compliance is more costly than the penalties stemming from noncompliance. But beyond the relatively small penalty for noncompliance, enforcement of China WEEE runs into the same problem that plagues enforcement of all environmental laws in China: the difficulty of balancing economic growth and environmental protection.

In contrast, the WEEE Directive merely provides that penalties be of sufficient amount to be “effective, proportionate, and dissuasive.”¹²⁶ From a review of the various Member States' penalty provisions, it seems that Member States have taken this requirement seriously. Member States have

122. *Id.* art. 31.

123. *Id.* art. 32.

124. *See generally Renminbi (Yuan)*, N.Y. TIMES, <http://topics.nytimes.com/top/reference/timestopics/subjects/c/currency/yuan/index.html> [<http://perma.cc/DG28-8RXXR>] (last visited Apr. 24, 2015) (currency exchange converter).

125. BROOKS ET AL., *supra* note 13, at 3.

126. Directive on Electrical and Electronic Equipment (WEEE), art. 22.

set penalties high enough to make noncompliance prohibitively expensive, and have fined producers for failing to implement laws.¹²⁷

IV. RECOMMENDATIONS

There is little information available on the success of China WEEE, but comparing its key provisions with those of the WEEE Directive, it seems clear that, as it stands now, the law will not create true extended producer responsibility. To extend producer responsibility, EPR laws must, at minimum, have four elements: (1) strong recovery requirements; (2) meaningful financial responsibility; (3) substantial oversight of recyclers; and (4) robust enforcement provisions. China WEEE's recovery requirements are not as robust as the WEEE Directive's; the fund China WEEE establishes does not create meaningful financial responsibility; China WEEE does not require oversight of recyclers; and the law's penalty provisions are too low to encourage compliance.

A. Stronger Recovery Requirement

To effectuate true EPR, China WEEE must have a stronger recovery requirement. In the context of e-waste, EPR laws must cover a broad range of products, must prevent waste from entering the municipal waste stream, and must obligate producer recovery.

China WEEE's recovery requirements are failing. The law applies to a limited range of products, does little to prevent e-waste from entering the waste stream, and merely encourages producers to recover their obsolete electronics. China WEEE's recovery requirements must be amended to benefit from extending producer responsibility. In amending the recovery requirements, Chinese lawmakers would do well to consider the WEEE Directive's collection and informational requirements, which do much more to obligate producers to recover their products and increase collection rates.

B. Financial Responsibility

China WEEE's financial responsibility provisions are inadequate and fall short of creating meaningful EPR. China WEEE obligates producers to

127. See Leo King, *Plymouth City Council Fined £12,000 for WEEE Breach*, COMPUTERWORLD UK (June 28, 2010), <http://www.computerworlduk.com/news/public-sector/20869/plymouth-city-council-fined-12000-for-weee-breach> [<http://perma.cc/9GGU-9DKG>] (discussing that in 2010, the United Kingdom fined Plymouth City Council £8,000 for allowing unauthorized recyclers to remove and sell computers from its waste plants without first checking that the companies were certified recyclers).

pay into a fund rather than pay the cost of recovering and recycling their products.¹²⁸ Because fund payments do not correspond to the cost of end-of-life recovery, they do not provide producers with the feedback necessary to incentivize product redesign. Product redesign will only occur when producers must pay the full price of recycling their product. Because one of the primary goals of EPR is to encourage product redesign, China WEEE's financial responsibility provisions fall short.

Chinese lawmakers should examine the WEEE Directive's financial responsibility provisions, which go further toward incentivizing product redesign. While no study confirms the WEEE Directive's impact on product redesign, individual financial responsibility should, in theory, encourage producers to redesign products for ease of end-of-life recovery.

C. Oversight of Recyclers

China WEEE must provide for more stringent oversight of recyclers. At present, China WEEE's permitting requirements are subjective and undefined, leaving recyclers and the government with little guidance.¹²⁹ In addition, China WEEE does not require inspections of recycling facilities.¹³⁰ By failing to provide clear permitting and inspection requirements, China WEEE does nothing to force producers to responsibly recycle their electronics. If the Chinese government is concerned about the toxins released through the improper recycling of e-waste, China WEEE must be amended to provide meaningful permitting and inspection requirements. The WEEE Directive provides extensive permitting requirements in Annex VII.¹³¹ Chinese lawmakers should consider these requirements before updating China WEEE's permitting system. To ensure permitting requirements are met, China WEEE must inspect recycling facilities instead of relying on self-reporting. Although the WEEE Directive neither imposes a frequency or thoroughness requirement on inspections, China WEEE could be more effective by requiring routine inspections and delineating exactly what the inspections must cover.¹³²

128. *Electronic Waste Rules*, CHINA BUS. REVIEW (May 1, 2009), <http://www.chinabusinessreview.com/china-recently-approved-long-awaited-electronic-waste-rules-but-a-product-catalogue-is-pending/> [<http://perma.cc/DN27-A9WZ>].

129. *Id.*

130. *Id.*

131. Directive on Electrical and Electronic Equipment (WEEE), annex VII.

132. *Id.* art. 23.

D. Enforcement

Setting penalties for violations is difficult. To be effective, a penalty must reach a level where compliance is cheaper than the risk of violation. It seems clear that the penalties imposed under China WEEE are too low to properly discourage noncompliance; however, it is not clear where penalties should be set. The WEEE Directive deals with this problem by requiring Member States to simply set penalties that are “effective, proportionate, and dissuasive.”¹³³ Member States have imposed substantial penalties on violators because if the EU determined a Member State’s penalty provisions were too low, it would take the Member State to court for failing to properly implement the WEEE Directive. While allowing individual Member States to set penalties is a unique and clever way to get around the difficult issue of setting appropriate penalties, it is not clear that a similar provision is warranted or advisable to deal with China’s electronics producers. Whether giving local governments the authority to set effective, proportionate, and deterrent penalties is reasonable would require an analysis of both the cost of compliance in different regions of China, and the relative ease with which the central government could oversee the local governments. Such analyses are outside the scope of this Article; however, it remains clear that the various penalties imposed by China WEEE are too low to encourage producers to comply with its provisions.

CONCLUSION

This Article sought to compare China WEEE with the purposes of EPR and its model, the WEEE Directive to determine whether China WEEE could fulfill the goals of EPR. This Article identified four key elements necessary to the successful implementation of EPR laws and compared the provisions of China WEEE with the provisions of the WEEE Directive that implement those four elements. Comparison of these provisions makes clear that China WEEE is lacking in all elements necessary for successful implementation of EPR. The recovery requirements are too weak; the financing responsibilities are too indirect; the oversight of recyclers is too little; and the penalty provisions are too low for China WEEE to effectuate extended producer responsibility.

To improve recovery requirements, Chinese lawmakers should broaden the scope of China WEEE, obligate producer recovery, and mandate strong information requirements so that producers internalize the deleterious

133. *Id.* annex VII.

externalities they produce. For China WEEE to create true EPR, the law must be amended to place full financial responsibility for recovery and recycling on individual producers instead of obligating producers to pay into a state-administered fund. If China is serious about reducing the improper recycling of electronics, China WEEE must incorporate explicit and clear permitting requirements for recycling companies, as well as require routine and thorough inspections of recycling facilities. Finally, to deter noncompliance, China WEEE must make noncompliance expensive by increasing penalties and ensuring violators are quickly and appropriately punished. If China is serious about extending the responsibility of electronics producers, China WEEE must be amended.