

Part VIII: Policies, Regulations, and Conventions

Toxin Phase-Out Policies in Canada and Globally

As a consequence of the growing concern over the environmental and health problems caused by toxins contained in WEEE, many jurisdictions have started introducing policies designed to phase out the toxic materials in electronic products or to reduce the illegal transboundary movement of e-waste.

RoHS Directive

The European Union (EU) has been and continues to be a world leader in WEEE management. In 2002, it introduced the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive, which was designed to eradicate certain hazardous substances from new electrical and electronic equipment (EEE). Individual member states are expected to transpose the directive into their own national legislation to deal with WEEE.

Specifically, the purpose of the EU's RoHS Directive is to contribute to the protection of human health and the environmentally sound recovery and disposal of WEEE by restricting the use of lead, mercury, hexavalent chromium, cadmium, polybrominated biphenyls, and polybrominated diphenyl ethers in EEE, in concentrations exceeding the values adopted by the European Commission (0.01% by weight per homogeneous material for cadmium and 0.1% for the other five substances). Beginning in July 2006, manufacturers of EEE within the scope of the directive are responsible for ensuring that their products comply with these requirements.

The directive applies only to electrical goods placed on the market in the European Economic Area (EEA). These goods include large household appliances; small household appliances; IT and telecommunications equipment; electronic consumer equipment; lighting equipment (including light bulbs), electronic and electrical tools, toys, leisure, and sports equipment; and automatic dispensers. It does not cover fixed industrial-plant and large-scale industrial tools. Moreover, RoHS does not apply to individual components and sub-assemblies—only to the end products comprised of them.

On account of the broad scope of the RoHS Directive and the long list of products it affects, the European

Commission acknowledges the fact that it may not be technically feasible to manufacture some products without the use of some restricted substances. In light of this, the directive includes provisions for exemptions where alternatives to restricted substances do not yet exist (e.g., mercury in some types of fluorescent lamps). In addition, two entire product categories have been exempted (medical devices and monitoring and control instruments) given that the reliability of alternative components has potentially life-threatening consequences.

It is estimated that the annual amount of waste not sent to landfill as a result of RoHS will be 89,800 tonnes of lead, 4,300 tonnes of cadmium, 537 tonnes of hexavalent chromium, 22 tonnes of mercury, and 12,600 tonnes of octabromodiphenyl ether (OctaBDE). In addition, it appears that the directive has significantly reduced the amount of hazardous substances released to air, soil, and freshwater, lessening toxicity to humans and the environment. The positive effects of this reduction are especially relevant for cadmium and hexavalent chromium.

Following the passage of the RoHS, several major international electronic firms, including Toshiba, Dell, Panasonic, Intel, Hitachi, Hewlett-Packard, and Apple, along with hundreds of their global suppliers, redesigned their products in order to become RoHS compliant and to continue to have access to the EU. What is notable is that these manufacturers are modifying their production systems not only for the products they sell in the EU but for their whole production lines, including products shipped to countries where no such laws exist. To demonstrate their progress in meeting the EU's regulatory requirements for their products, many companies now have "RoHS status pages" on their websites.

California WEEE Provisions

The United States does not have a national WEEE initiative. In the face of such inaction, many individual states have taken it upon themselves to enact e-waste legislation and put in place infrastructure for recycling WEEE. A striking example is provided by the state of California, whose statute represents a clear adoption of the European regulatory standard.

Coming into effect on January 1, 2007, California's RoHS regulations prohibit covered electronic devices from being sold or offered for sale in California if those devices are

prohibited from being sold or offered for sale in the EU due to the presence of certain hazardous substances (lead, mercury, cadmium, or hexavalent chromium) exceeding the established maximum concentration values.

Although modelled after the EU directive, California's RoHS regulations are much narrower in scope. For example, while the EU's RoHS Directive covers "electrical and electronic equipment," which, in effect, is any device that requires or generates an electric current for its function, California's list of "covered electronic devices" is restricted to specific video display devices. The directives are also different in that the RoHS Directive restricts the use of two brominated flame retardants, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) in electronic devices whereas California's regulations do not. Another weak point in California's RoHS is that it applies only to those "covered electronic devices" manufactured on and after the date that the devices first became subject to the regulations. This limitation contrasts with the EU's RoHS approach, which subjects electronic devices to the regulations whether they were put on the market on or after the date the directive came into force, regardless of when the devices were produced.

As with the EU legislation, California's RoHS regulations have an impact extending far beyond the borders of the state. Though it does not comprise as much of the electronics market as Europe, California has directly affected business practices because any product under the purview of its RoHS regulations that enters the state must be in compliance. In other words, national and regional regulations, for example those in Europe or California, have a worldwide affect because manufacturers do not make special models for different areas of the world. They will strive to make all new electronic and electrical devices compliant with all current legislation so as to enable sales in as many markets as possible.

Effectiveness of Toxic Substance Phase-Out Policies

In spite of these achievements, it is fair to say that the EU directive has not been as effective as anticipated. A major concern with RoHS has to do with enforcement. First, the directive takes a "self-declaration" approach in which goods are simply presumed to be in conformity because their producers have said so. Aside from random audits, investigation into whether a product is compliant with the requirements is warranted only when producer documentation is thought to be deficient. In general, there is no prescribed method to demonstrate compliance nor is

there a requirement for certification. Under UK regulations, for instance, a producer is only required to develop and maintain sufficient documentation to demonstrate compliance. Another major issue with RoHS concerns exemptions. As previously stated, these are allowed when alternatives to restricted substances do not exist. There are currently 29 exemptions, and requests for others have been made. Long exemption processing times create problems for manufacturers; the uncertainty as to whether a substance will be exempted from the requirements has caused some manufacturers to halt certain product lines, while others continue to manufacture their products hoping that their applications for exemption will ultimately be approved. These issues aside, it is worth noting that the EU has made significant strides addressing the issue of WEEE compared to other jurisdictions.

National and International Regulations and Conventions to Control the Transboundary Movement of WEEE

Basel Convention

In an increasingly globalized world, concerns over the environmental impacts of international trade are growing. Particularly controversial is the international trade in hazardous waste, including e-waste, which has severe consequences for both the environment and human health. With the cost of local disposal on the rise as their governments impose stricter regulations to protect human health and the environment, players in industrialized countries in North America and Western Europe have been exporting more and more of their e-waste to developing countries in the South. In fact, it is estimated that anywhere between 50% and 80% of all waste electronics are sent to Asia for processing, where low-paid workers (without personal health or environmental protection measures) sort through discarded WEEE and processes it using a variety of low-tech methods, including manual disassembly and open burning.

A range of legislation has emerged in response to this problem, the most notable example of which is the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Adopted by the United Nations in March 1989 and entering into force in May 1992, the Basel Convention is the most significant multilateral environmental agreement (MEA) relating to e-waste and its management. It covers a wide range of waste material defined as "hazardous wastes" based on their origin, their composition, and their characteristics, as

well as two types of waste defined as “other wastes” (household waste and incinerator ash).

As of 2013, there were 180 signatories to the convention. Despite being a major actor, the United States has not yet ratified it.

The Basel Convention has several objectives related to the waste hierarchy of prevention, reduction, recovery, and final disposal, including (1) to reduce hazardous waste generation at its source, (2) to promote the environmentally sound management (ESM) of hazardous waste, (3) to advocate for disposal as close to the source as possible, and (4) to regulate and monitor the transboundary movements of hazardous waste.

For the waste deemed to require transboundary movement, the Basel Convention imposes numerous trade restrictions. For example, hazardous waste materials can be exported only if the exporting state lacks the capacity to deal with them in an environmentally responsible manner or if they are destined for recycling and recovery. If all these criteria are met, the shipment must still receive prior informed consent. In other words, prior to transboundary movement, an exporter must notify the destination country, as well as any intermediary countries, of its intent to trade in hazardous waste through a notification of consent.

In 1995, the UN made an amendment to the convention that outright banned the shipment of hazardous waste from developed to developing countries for any purpose. Although this amendment is undoubtedly an improvement, it is not in effect because it has not yet been ratified by the required three-fourths of the parties who accepted the convention. Canada, for example, has signed the Basel Convention but has not signed the amendment. Another major issue is that exporters are able to skirt the Basel Convention and its export and import regulations by claiming that the material is being exported for recycling or reuse and not for disposal. Another problem lies in the tracking of waste across national boundaries. Although it is estimated that more than half of all e-waste is exported to Asia for processing, there is no way to confirm this number because neither Statistics Canada nor the Canada Border Services Agency tracks this information. As a result of these loopholes, significant levels of WEEE, including hazardous materials, continue to be sent to developing nations.

Canadian Hazardous Waste Regulations

As noted, a number of jurisdictions have already begun to implement legislation to require that EEE be designed with less toxic materials. In Canada, the federal government is responsible for enacting e-waste regulations through toxic

substance control legislation. Its approach to e-waste is twofold: to reduce the quantity of toxic material used in electronics and to reduce the release of toxic material at the end-of-life stage.

Although the federal government has not exercised its authority and specifically imposed regulations on the use of toxic substances in electronics, as has the EU and California, Canadian federal policy acknowledges and supports the international concerns about the use of toxics.

In Part 5 of the 1999 *Canadian Environmental Protection Act* (CEPA), Canada’s federal environment minister has the power to implement regulations that ban or impose restrictions on products that contain substances noted in the act’s “List of Toxic Substances” (Schedule 1). Several of the listed substances are substances commonly found in electronics, such as lead, mercury, hexavalent chromium, cadmium, polybrominated biphenyls, and polybrominated diphenyl ethers.

In addition to certain restrictions on listed toxic substances, Canada has put in place regulations designed to control the export and import of hazardous materials. Under Canada’s *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations* adopted under Section 191 of the CEPA, hazardous waste and hazardous recyclable materials that are moved across international borders must be managed in a socially and environmentally responsible manner. The regulations maintain, for example, that hazardous material should be recycled and disposed of only at authorized facilities and that all transboundary shipments of these wastes must be tracked until they reach their final location. As well, written confirmation of disposal or recycling must be given.

Compared to markets in the United States or in EU nations, the Canadian market for electronics is much smaller; therefore, Canadian legislation controlling WEEE may not have as great a global impact on international business as regulations adopted in those countries. Nevertheless, it would be unfair to say that Canadian legislation has no influence on product design.

China’s “Green Fence”

As the world’s primary manufacturing country, China has an appetite for recycled raw materials, namely for metals, paper fibres, and plastics. The developed nations of the world have ample supplies to export to China. According to the US International Trade Commission (USITC), in 2011, exports from the United States to China of scrap copper, aluminum, ferrous metals, paper and paperboard, and plastic accounted for 11.3 billion in exports. This figure is

double that from 2006 and represents over 10% of all US exports to China. Other nations send enormous amounts of scrap there as well.

The low quality of the bales of collected materials, in terms of contamination, has forced China to institute a policy, known as the “green fence,” regarding incoming shipments of scrap. In February 2013, the fence went up. Designed to keep contaminated materials out by imposing a limit of 1.5% contamination allowed in a shipment, the new initiative includes random inspection of all imported waste.

Early results show that the policy is having an effect. According to *Plastics News*, the first three months of enforcement saw more than 7,600 tons of recyclable materials rejected or sent back to suppliers and the import licenses of 247 companies suspended by customs officials.¹⁴ Shipments of plastic alone are estimated to be down 5.5% in the first four months of 2013 (which includes January, before the fence went up).¹⁵

What this legislation means for shipments of WEEE to China is not entirely clear at this point. The fence is only supposed to stay up for 10 months, but it is possible that it will be extended beyond the month of November 2013. Clearly, waste electronics could hypothetically be held up in the port, or exporters from Canada and the United States may have to adjust primary collection or processing methods to ensure that loads will not be rejected and sent back.

Effectiveness of International Regulations on the Transboundary Movement of WEEE

Despite the good intentions of global agreements and conventions such as the Basel Convention, evidence suggests that WEEE containing hazardous materials continues to be exported from developed countries to developing countries. Loopholes exist in the regulations that allow for unscrupulous vendors to send the materials illegally and not get caught. The primary problems are of definition and enforcement.

¹⁴ “US-based Recyclers May Gain from China’s ‘Green Fence,’” *Plastics News*, July 12, 2013, <http://www.plasticsnews.com/article/20130712/NEWS/130719975/us-based-recyclers-may-gain-from-chinas-green-fence>.

¹⁵ Steve Toloken, “China’s ‘Green Fence’ Makes Unprecedented Cuts in Recycled Plastic Imports,” *Waste & Recycling News*, May 20, 2013, <http://www.wasterecyclingnews.com/article/20130520/NEWS02/130529995/chinas-green-fence-makes-unprecedented-cuts-in-recycled-plastic-imports>

Both the Basel Convention and the Canadian *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations* control the export and import of hazardous wastes going for disposal and recycling through a prior informed consent procedure. Shipments of electronics are controlled when the material meets the definition of hazardous waste under the Convention and some restrictions apply to certain used electronic materials sent for purposes of recycling (including reuse) between OECD countries.

Ostensibly, this policy is good, as it encourages reuse and it provides a channel for poorer countries to get some expensive electronic goods at low prices. The problem is that it remains fairly simple for a shipper to claim that a shipment is designated “for reuse”, even if that may not be the case.

This problem is not new. When Basel was first introduced, the export of waste intended for disposal from OECD countries to non-OECD countries was reduced by 31% between 1990 and 1995. At the same time, waste designated for purposes of reuse increased by 32%.¹⁶ There is no way to keep track of how much material that is labelled for reuse may have been shipped for actual disposal in the intervening years, but it is likely that it still happens. One of the primary reasons it is impossible to keep track of, let alone stop, this practice is that there is very little political will or funding to provide adequate monitoring and enforcement.

For example, it would be very difficult for Canadian authorities to develop a test to determine if a shipment of goods is, in fact, reusable. Some products or components are relatively easy to test, such as a cell phone. Others are more difficult, such as the individual parts of larger, integrated computer systems for businesses. Even if a set of testing protocols were developed, it would be unfeasible and impractical to test every single container destined for export. Even if it were possible to test all of these shipments, the ever-changing nature of electronic devices may render a set of test procedures invalid because of year-to-year differences in the goods themselves.

This is not to say that national and international regulations governing the transboundary movement of WEEE are entirely ineffective. Nevertheless, many challenges remain, including those created by the difficulties in defining the nature of e-waste and recycling as well as those related to enforcement. As these problems are addressed over time, the effectiveness of the regulations will increase.

¹⁶ Djahane Salehabadi, *Transboundary Movements of Discarded Electrical and Electronic Equipment, Solving the E-Waste Problem* (StEP) Green Paper (Tokyo: United Nations University, March 2013).