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**INTERNATIONAL SOLUTIONS TO E-WASTE: THE
BASEL CONVENTION, THE RESTRICTION ON
HAZARDOUS SUBSTANCES (ROHS) DIRECTIVE, AND
THE WASTE ELECTRICAL AND ELECTRONIC
EQUIPMENT (WEEE) DIRECTIVE**

Electronic waste, or e-waste, has attracted the attention of citizens and lawmakers around the world as the number of electronic devices entering the waste stream continues to grow at an almost exponential rate. At the federal level, Congress and the EPA have taken small steps to restrict the disposal of large quantities of the most hazardous substances that are found in electronic devices. Several states have made further progress by enacting e-waste recycling laws that apply to individuals and businesses disposing small quantities of e-waste. In the European Union (EU), the member states endorsed a different approach to the problem of e-waste with the passage of the RoHS and WEEE Directives in 2003. The RoHS Directive addresses the e-waste issue by restricting the use of six hazardous substances in the manufacture of certain electronic devices. The WEEE Directive addresses the disposal of certain electronic devices by requiring manufacturers to develop a system that allows citizens to return their devices to the manufacturer free of charge. In addition to the RoHS and WEEE Directives, many countries, including the EU member states, are signatories to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention) which limits the export of hazardous waste from developed countries to developing countries.

The Problem of E-waste

Consumer electronic devices pose a unique threat to human and environmental health. Although concentrations of hazardous substances in consumer electronics is relatively low, the sheer number of these devices entering the municipal solid waste stream presents a situation where the collective volume of hazardous waste becomes quite large. For example, the National Safety Council estimated that more than 300 million computers became obsolete in the United States in 2004. The International Association of Electronics Recyclers projects that 1 billion computers will be scrapped worldwide by 2010, at a rate of 100 million units per year. From an international perspective, e-waste presents a different type of problem. In many instances large containers of electronic devices are shipped to developing countries where the devices are disassembled, usually to recover a single valuable component, and then discarded in large piles creating very significant concentrations of hazardous substances.

The Basel Convention

The Basel Convention is an international treaty that went into force in 1992 and currently has 172 nations signed as parties. Although the United States is a signatory, it has not ratified the treaty and therefore its provisions are non-binding on the US. The purpose of the treaty is to restrict and manage the export of hazardous substances, including many types of electronic devices, to developing countries. Although there is no indication that the US intends to ratify this treaty, many states are including 'environmental responsibility' standards in e-waste legislation in an attempt to provide some level of assurance that electronic recyclers are ultimately disposing electronic devices in an environmentally responsible manner.

The RoHS Directive

The European Union adopted the RoHS Directive in 2003 in response to growing concerns over the disposal of electronic equipment containing hazardous substances. The Directive limits the concentration of the following six hazardous substances in the manufacture of certain electronic devices: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBE), and polybrominated biphenyl ether (PBDE).

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Additionally, the limitations on the six hazardous substances listed in the RoHS Directive only apply to the following categories of electronics:

1. Large and small household appliances
2. IT equipment
3. Telecommunications equipment (infrastructure equipment is exempt in some countries)
4. Consumer equipment
5. Lighting equipment—including light bulbs
6. Electronic and electrical tools
7. Toys, leisure, and sports equipment
8. Automatic dispensers

Within these broad categories there are also approximately 30 individual exceptions.

The WEEE Directive

The WEEE Directive created one of the first producer-responsibility models for electronics recycling, which has become the preferred model for US states in addressing electronics recycling. The producer responsibility model established by the WEEE Directive includes meeting labeling requirements, providing information to end-users and treatment facilities, ensuring the availability of collection infrastructure, submitting sales and recovery data, and financing WEEE costs.

Consideration of RoHS and WEEE in the US

Although there is no federal electronics recycling program or law in the US, many states have moved forward with e-waste legislation creating several types of recycling programs. The majority of states that have enacted legislation have used the producer-responsibility model, similar to the framework established by the WEEE Directive. During the 2008 legislative session, the Virginia General Assembly passed legislation creating a producer-responsibility computer recycling program, HB 344 (Plum), which places the responsibility on computer manufacturers to implement a recovery plan for collecting and recycling a portion of computers returned or discarded by citizens of the Commonwealth.

Although several states have restrictions on the use of mercury in thermostats and certain types of switches, only one state, California, has enacted broad legislation addressing the use of hazardous substances in the manufacture of electronic devices. In 2003 California passed SB 20, establishing the Electronic Waste Recycling Act of 2003 (EWRA), which prohibits the sale of the following consumer devices unless they meet the manufacturing restrictions in the California RoHS Directive (as applied only to lead, mercury, cadmium, and hexavalent chromium):

1. Computers and televisions with cathode ray tubes (CRT)
2. Desktop computers, laptops and televisions with liquid crystal displays (LCD)
3. Plasma televisions

As developed and developing countries continue to produce and discard larger and larger quantities of electronic devices containing hazardous substances, addressing both the beginning and end of a product's lifecycle will be essential. Although the RoHS Directive has not achieved the same level of acceptance in the US as the producer-responsibility recycling model contained in the WEEE Directive, the concept of limiting the use of hazardous substances in the manufacture of electronic devices is gaining momentum.

Resources

Product Stewardship Institute, <http://www.productstewardship.us> (as of June 1, 2009)

Wikipedia, *Basel Convention*, http://en.wikipedia.org/wiki/Basel_Convention (as of May 22, 2009, 17:41 GMT).

Wikipedia, *Restriction of Hazardous Substances Directive*, http://en.wikipedia.org/wiki/Restriction_of_Hazardous_Substances_Directive (as of Apr. 30, 2009, 19:04 GMT).

Wikipedia, *Waste Electrical and Electronic Equipment Directive*, http://en.wikipedia.org/wiki/Waste_Electrical_and_Electronic_Equipment_Directive (as of May 22, 2009, 20:30 GMT).

Currently 19 states have some form of producer-responsibility electronics recycling law and nine states are considering electronics recycling legislation in 2009.