COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENATIVES

HEARING CHARTER

Electronic Waste: Can the Nation Manage Refuse in the Digital Age?

Wednesday, April 30, 2008
10:00 a.m. to 12:00 p.m.
2318 Rayburn House Office Building

Purpose

On April 30, 2008 the Committee on Science and Technology will hold a hearing on the management of waste electronic equipment (e-waste) in the United States. Witnesses will discuss industry practices for recycling, refurbishment, re-sale and disposal of electronic products and the challenges associated with end-of-life management of electronic products. The hearing will also examine the potential of research and development in green design efforts to make recycling easier and decrease the amount of toxic material used in electronic products, as well as in creating frameworks for understanding the economic and environmental impacts of re-use and recycling.

The Committee will hear testimony from six witnesses offering perspectives from the electronics manufacturing sector, the recycling industry, non-profit service provider, and academic research and development.

Witnesses

- **Mr. Gerardo Castro** is the Director of Contracts and Environmental Services, Goodwill Industries of Southern California, Los Angeles, California. Mr. Castro will discuss the scope and magnitude of e-waste in this country, as well as the volume of electronic products received by Goodwill Industries annually and their product recycle, refurbish, and re-sale operations.

- **Ms. Renee St. Denis** is the Director of America's Product Take-Back and Recycling for Hewlett-Packard Company. Ms. St. Denis will discuss the origin and history of HP's take-back and recycling program and how it has influenced product design. She will also discuss, from HP's perspective, the types of innovations that are needed to promote electronic product recyclability and the increased use of recycled materials.

- **Mr. Eric Harris** is the Associate Counsel and Director of Government and International Affairs for the Institute of Scrap Recycling Industries (ISRI). Mr. Harris directs ISRI's waste policy operations and will discuss the challenges faced by e-waste recyclers as well as recycling best-practices. He will also discuss the amount of e-waste that recycled in the U.S. versus the amount exported.

- **Mr. Ted Smith** is the Chair of the Electronics Take-Back Coalition. Mr. Smith will discuss the evolution of the e-waste problem, the advantages and disadvantages to product re-use, and the type of research and development initiative needed to foster more environmentally-friendly electronic products.

- **Mr. Michael Williams** is the Executive Vice President and General Counsel for Sony Electronics Incorporated. Mr. Williams will discuss Sony's approach to the electronic waste issue and whether their efforts in end of life management have influenced product design. Mr. Williams will also discuss, from Sony's perspective, the types of innovation needed to promote electronic product recyclability and increased use of recycled materials.

- **Dr. Eric Williams** is an Assistant Professor of Civil and Environmental Engineering at Arizona State University. His research focus is industrial ecology, life cycle assessment, and macro assessment of supply and demand. Dr. Williams will discuss the environmental impacts associated with manufacturing of electronic products, the challenge in tracking the reuse and recycling industry, and options for reducing the environmental impacts of this industry.

Background

Electronic waste (e-waste) is the term used to describe electronic products at the end of their useful life. This includes: computers, televisions, VCRs, stereos, printers, cell phones, fax machines, copiers, and other commonly used electronic products. The use and production of these products is integral to the digital age and our economy. However, due to product failure or the desire to purchase more advanced technology, the number of discarded electronic products is rapidly increasing. Indeed the lifespan of some of this equipment is as short as 18 to 24 months. The National Safety Council[1] estimated that over 499 million personal computers became obsolete between 1997 and 2004 and the Government Accountability Office estimates that 100 million televisions, computers, and monitors become obsolete each year.[2] With the fast rate of technology improvement and the rate that many industrializing countries will soon also be discarding large numbers of used electronics, the volume of e-waste globally stands to grow substantially.

There currently is no specific federal law or regulation governing the disposal of consumer electronic products in the United States. In 2000, the National Electronic Products Stewardship Initiative (NEPSI) brought stakeholders together in an effort to create a consensus on the shape of a national e-waste management framework. This process stalled in

[1] National Safety Council, *Electronic Product Recovery and Recycling Baseline Report: Recycling of Selected Electronic Products in the United States*, Stanford Resources, Inc. (1999)
[2] Government Accountability Office, *Electronic Waste: Strengthening the Role of the Federal Government in Encouraging Recycling and Reuse*, November (2005).

2004 when stakeholders could not agree on a financing mechanism for a product take-back system. Due to the presence of toxic materials like lead and mercury, several states now mandate end-of-life electronic product management. The patchwork of state laws has many in industry now turning to the federal government for a national framework that will harmonize the different state laws.

Thirteen states have e-waste laws. California implemented a program in 2005. Maine, Washington and Minnesota implemented e-waste programs in 2007, and other states with legislatively mandated programs will bring those programs online in the near future. Many electronics producers and retailers now offer some type of product take-back service. Despite this progress, the EPA estimates that at most only 15 percent of products at the end of their useful lives reach a recycling or re-use program. Cell phone producers, who have one of the most established take-back programs and whose product is easy for the consumer to return, only recapture a fraction of the phones they sell. According to the EPA, about 2 million tons of unwanted electronics end up in landfills or incinerators on average, while only 345,000 tons were "recycled".[3] Many producers, recyclers, and experts site consumer behavior and the logistics of gathering large volumes of waste as a major hurdle to cost-effective recycling.

Waste Management Issues

When properly handled, used electronic products can be a valuable source for reusable equipment or secondary feedstock. However, when not properly handled, studies show that the components of these items can be sources of toxins and carcinogens. Cathode ray tubes (CRTs), the glass picture tubes found in some televisions and computer monitors, contain approximately five to eight pounds of lead, chromium, nickel, and zinc. Circuit boards also contain considerable quantities of lead-tin solders and are likely to leach into groundwater or be emitted in gaseous form if destroyed in an incinerator. Up to thirty-eight separate chemical elements are incorporated into electronic waste items.

In addition to concerns about pollution and volume regarding disposal of these products in landfills, electronic equipment also contains valuable resources. The U.S. Geological Survey estimates that scrap electronics contain significantly higher concentrations of copper, gold, and other metals than an equivalent weight of a typical ore. The recovery of the metals in e-waste decreases the need for virgin materials and lessens the impact on the environment that extraction of those materials represents.

It is also important to consider that even with an increased content of recovered materials; the production of electronic products carries a significant environmental foot-print. Rapidly changing production methods and a scarcity of current data make accurately assessing product life-cycle difficult. Microchip fabrication, circuit board and component manufacturing, and the production of plastics, metals, glass, and the specialized chemicals used in the electronics industry have high energy and water requirements and require the use of chemicals that are harmful to human health and the environment. Many producers have made strides in

[3] Environmental Protection Agency, *Management of Electronic Wastes in the United States*, November 2007. http://www.epa.gov/ecycling/

increasing the efficiency and lessening the impact of manufacturing, but the entire life-cycle of electronics still has a significant environmental footprint.

Obsolete devices from industrialized countries can find their way to developing countries, where old computers and cell phones are often used for a few more years or processed for disposal. High disposal costs and landfill fees in the developed world have conspired with low labor costs and lenient health and environmental regulations in the developing world to create an incentive to export used electronic products to nations like China and Nigeria. Some of these products are received for legitimate refurbishment and re-use, but an overwhelming quantity has no re-use value and is improperly and unsafely recycled or landfilled. Primitive recycling creates health hazards for the laborers and environmental problems for their communities. According to the Basel Action Network (BAN), approximately 80 percent of the e-waste directed to recycling in the U.S. is not recycled, and instead finds its way overseas. There is no universally accepted standard to qualify a product for re-use.

Many recyclers are environmentally responsible and health and safety conscious, but there are still numerous "sham" recycling operations that engage in harmful practices, particularly with regards to export. Stakeholders are working with the EPA to create a set of best practices for environmental management in electronics recycling, but there currently is no one universally accepted standard for electronics recycling. Electronics "recycling" can also be a misleading characterization of practices, since most of the material recovered from the product, in particular the plastics and the glass, is not re-used directly in the electronics industry, and much is fated for incineration (i.e. fuel for smelters and furnaces).

The U.S. is behind many other countries in confronting the e-waste challenge. The European Union (EU) took action in 2000 by passing the Waste Electrical and Electronic Equipment Directive (WEEE), which bans the disposal of e-waste in landfills and requires electronics producers to take back their used products. The WEEE Directive imposes the responsibility for the disposal of e-waste on the manufacturers. Part of the impetus for this policy was the theory that giving the producers the responsibility of recycling their own products would encourage them toward greener designs and products that are more easily recycled. It is too soon to assess whether these disposal laws have motivated producers to adopt greener designs. However, the EU Restriction of Hazardous Substance (RoHS) Directive banning the import of electronics with toxics like lead and cadmium has motivated the use of greener materials in electronics sold around the world.

Recognizing the need to find better end-of life management for these products, the EPA and many producers, retailers, state and local governments have been working to improve the awareness of the need for recovery of electronics and access to safe reuse or recycling options. This is a national problem and there is a need for standards and safeguards for environmentally sound disposal practices that strike a balance between manufacturer and consumer responsibility.