
Cell Phones: A Poster Child for Extended Producer Responsibility

In the US and around the world, waste generated by discarded cell phones is an issue of growing concern. Over 1 billion cell phones are currently in use worldwide. In the US, subscriptions have increased from 340,000 in 1985 to almost 153 million at the end of 2003. These high rates of use, combined with the very brief, 18-month average lifespan of the typical phone, are producing enormous and increasing quantities of cell phone waste. By 2005, approximately 100 million cell phones will be retired each year in the US, over 25 times more than in 1990. While many of these units will initially be stored away in closets and drawers, all will eventually be thrown out in the trash and wind up in landfills and incinerators — at least if current trends continue. Moreover, the new US portability rule, which allows consumers to switch their wireless carrier without changing phone numbers, will likely result in millions more people changing providers and replacing their phones in the next few years.

Cell Phone Waste Is Toxic

Cell phones are especially problematic because they contain a large number of hazardous chemicals, which can pollute the air when burned in incinerators and leach into soil and groundwater when buried in landfills. In particular, they contain a number of substances — including antimony, arsenic, beryllium, cadmium, and lead — that belong to a class of chemicals known as persistent, bioaccumulative toxins, or PBTs. PBTs are of special concern because they:

- Linger in the environment for long periods without breaking down.
- Can accumulate in the tissues of animals, building up in the food chain to dangerous levels even when released in very small quantities.
- Have been associated with cancer and a range of reproductive, neurological, and developmental disorders.

Cell phones also contain brominated flame retardants, some of which can be persistent, bioaccumulative, and toxic.

- Two categories of flame retardant — polybromi-

nated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) — have been associated with cancer and disruption of the immune and endocrine systems.

- Some flame retardants can form dioxins and furans, a group of highly toxic and persistent by-products of combustion, when products that contain them are incinerated or recycled.

Product Redesign the Long-Term Solution

Ultimately, preventing cell phones (and other electronic products) from leaving behind an enormous legacy of toxic pollution for future generations means designing them in ways that facilitate reuse and recycling and eliminate or reduce their toxic components. Many of the most common impediments to cost effectively recycling these products or refurbishing them for reuse could be removed through relatively simple changes in design and manufacturing. These include:

- Using durable components that reduce the number of parts that need to be replaced during refurbishment.

- Facilitating disassembly (by replacing screws with snap-on parts, for example) so phones can be taken apart and reassembled quickly and easily.
- Standardizing accessories (such as batteries and adapters) so the same components can be used in different cell phone makes and models.

Extended producer responsibility (EPR) is a uniquely effective driver of such design changes because it gives manufacturers physical and/or financial responsibility for managing their products after consumers discard them. By requiring manufacturers to take back and recycle their products, EPR provides a powerful incentive to come up with long-lasting designs that facilitate reuse and recycling.

EPR Drives Product Redesign

EPR is a proven policy for promoting sustainable product design. In Europe, two recently adopted directives on electrical and electronic waste are having far-reaching effects on manufacturers and their products around the world:

- The Directive on Waste Electrical and Electronic Equipment (WEEE Directive) establishes a reuse/recycling target of 65 percent for all IT equipment such as computers and cell phones.
- The Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive) requires the elimination of certain toxic substances (such as mercury, lead, PBBs, and PBDEs) from all such products, also by 2006.

Since all manufacturers (including US manufacturers) will have to meet the requirements of these directives for products they market in the European Union (EU), those offering items that can be efficiently reused or recycled and that contain alternatives to the targeted toxic chemicals will have a competitive advantage.

The WEEE Directive requires all EU member states to enact laws mandating product take-back and recycling, and versions of EPR have been implemented in Australia and Asia as well. In Japan, EPR programs for computers and electrical appliances

(air conditioners, refrigerators, televisions, and washing machines) went into effect in 2001, and have been at least partly responsible for Japanese leadership in design for environment.

Collection Programs a Helpful Strategy

Despite increasing recognition of the problem of cell phone waste, advances in sustainable product design have been minimal. In the absence of such environmentally preferable products, programs that collect used phones for reuse and recycling can help to ameliorate this growing and toxic waste stream. Moreover, given the enormous volume of cell phone waste and its toxicity, collecting used phones for reuse and recycling is a critical strategy, and will remain so even after environmentally sustainable designs become available.

In the US, collection programs are currently the only available method for dealing with discarded cell phones in an environmentally responsible manner. A number of such programs have been under way since 1999.

- The largest and most successful programs are the Wireless Foundation's Donate a Phone family of programs (<http://www.wirelessfoundation.org/DonateAPhone/index.cfm>) and Verizon's Hope Line program (<http://www.verizonwireless.com/b2c/aboutUs/communityservice/hopeLine.jsp>).
- Numerous smaller programs, such as Collective Good International (http://www.collectivegood.com/donate_phone.htm) and the Charitable Recycling Program (<http://www.charitablerecycling.com/CR/home.asp>), are run by smaller organizations independent of the wireless industry.
- An expanded version of AT&T Wireless' recovery and reuse program (http://www.attws.com/our_company/cares/recycle.program.html) began in April 2003.

These collection programs recover used phones of all makes, models, and condition (including batteries,

adapters, headsets, and phone cases) from consumers by four principal means: (1) permanent collections at retail stores; (2) short- or long-term collection drives held at retail stores or in partnership with government agencies, businesses, schools, and other organizations; (3) collections at football games and other sports events; and (4) direct shipment by donors to the program's headquarters or refurbishing/recycling facility.

The vast majority of phones collected by these programs are refurbished and resold; smaller numbers are donated to individuals or sold to recyclers. Most of the revenues raised are used for charitable purposes.

Current Programs Recover a Fraction of Discarded Phones

Thus far, these collection programs have recovered only a negligible portion of the millions of phones discarded each year. Between 1999 and 2003, Donate a Phone, HopeLine, CollectiveGood, and Charitable Recycling collected approximately 2.5 million cell phones, about 1 percent of the phones discarded during this period, and an even smaller fraction of the hundreds of millions of units removed from service to await disposal later on.

Another problem with the collection programs as they currently exist is that they fail to take any responsibility for the ultimate destination of the phones they recover. The majority of collected and refurbished units are sold abroad, in developing countries, where little or no infrastructure is in place to manage them responsibly at end of life. Thus, these programs are providing just a temporary solution to the problem of cell phone waste by shifting the disposal problem abroad. There is also evidence that foreign workers in Asia are being exposed to unsafe levels of toxic chemicals at facilities that recycle exported electronics, including cell phones.

Improving Collection Programs through EPR

In light of the minimal impact of existing collection programs on the number of cell phones entering landfills and incinerators, policy initiatives mandating EPR

(or elements of EPR) offer a proven means of increasing collection rates. Making manufacturers responsible for refurbishing and recycling their used cell phones would give them a compelling reason to come up with designs that facilitate these processes, and because such phones would allow them to increase the revenues generated by recovered units, their incentive to collect more phones would also increase.

In the EU and in countries that have implemented EPR on their own, collection targets, toxic material reduction targets, and reporting requirements are critical to program effectiveness. In the US, existing cell phone collection programs could be improved if manufacturers were required to:

- Meet targets for cell phone collection, reuse, and recycling.
- Meet targets for reducing their products' toxic constituents.

At the same time, individual collection programs could be improved by:

- Providing periodic reports on the collection and end use of refurbished phones. This would provide valuable information on program efficiency and the destination of cell phones that wind up abroad.
- Publicly disclosing this information, which would allow consumers to evaluate the global effectiveness of each program.

Policy Initiatives to Promote Manufacturer Responsibility and Design for Environment

Policy initiatives at the state, federal, and even at the international level could increase collection rates, encourage manufacturers to offer more environmentally sustainable products, and require manufacturers (and collection programs) to take responsibility for cell phones at end of life. For example:

- Legislation requiring municipalities to create systems for recovering, refurbishing, and recycling used phones would spur manufacturers to design for environment.
- Laws that impose deposit refunds on cell phones

would increase the incentive for consumers to return their used phones for reuse and recycling.

- Fees imposed on the purchase of cell phones could be used to fund recovery, reuse, and recycling programs. In California, electronics recycling legislation includes measures that place up-front fees on products that contain CRTs and flat-screen or LCD displays.
- Banning certain products from disposal in landfills would increase the demand for reuse and recycling as alternatives to disposal. In the past several years, Massachusetts, California, New Jersey, and other states have restricted certain lead-containing consumer products (such as lead-acid batteries and CRTs) from landfills.
- International standards governing the recycling, refurbishing, and disposal of used cell phones, such as those now being drafted by the Basel Convention's Initiative for a Sustainable Partnership on Environmentally Sound Management of End-of-Life Mobile Phones, could have an effect on the export of used phones by US collection programs.

Bans on specified toxic chemicals in products, such as those imposed by the EU, would also be effective.

- INFORM's research on waste generation in the Great Lakes region indicates that, since the implementation of the RoHS Directive and an earlier European directive on end-of-life vehicles, waste generation amounts for cadmium, chromium, lead, mercury, and PBBs (all targeted by one or both of the directives) have declined more than for other chemicals. Apparently, manufacturers are aware of the new constraints on products marketed in Europe and are making efforts to replace toxic feedstocks with more benign alternatives.
- California's new electronics recycling law contains "RoHS-equivalency" measures prohibiting the sale of any electronic product in the state that would be prohibited from sale in the EU because of the presence of heavy metals.

The Power of Government Purchasing

Together, federal, state, and local governments spend approximately one-quarter of this country's gross domestic product. By incorporating environmental requirements into their purchasing specifications for cell phones, government agencies could leverage this enormous purchasing power and encourage manufacturers to take responsibility for their end-of-life cell phones and offer environmentally preferable designs. Cell phone contracts can give preference to vendors that:

- Quantify the amount of specific chemicals — such as lead and brominated flame retardants — contained in their phones. This would allow purchasers to choose brands with the lowest quantity of the most toxic chemicals and identify any less toxic alternatives.
- Offer products that can be easily disassembled and contain a high percentage of recycled content, allowing purchasers to favor those products that can be refurbished and recycled most easily.
- Offer to take back phones for reuse and recycling and ensure that their products are properly disposed of at end of life.

Requirements such as these would send a strong message to manufacturers that government agencies are serious about avoiding products that contain toxic chemicals and finding alternatives to disposal. This, in turn, would encourage competition among vendors to reduce or eliminate their use of these chemicals and find ways to design for reuse and recycling.

http://www.informinc.org/Fact_cellePR.pdf