Electronic Waste Needs to Go Green

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(PhysOrg.com) -- Americans love their consumer electronics, but what happens to all the gadgets when their useful life is over? Despite being one of the largest generators of "e-waste" in the world, the U.S. has no federal policies on recycling electronic waste or handling hazardous materials from technological trash.

It's time to change that, argue four University of California scientists in an article in the Oct. 29 issue of the journal *Science*. The authors point out that electronic junk from the U.S. is not just a domestic problem, but a global one.

Devices such as cell phones and computers contain both valuable materials, such as gold and silver, and hazardous ones, such as lead, cadmium and other heavy metals. Efforts to recover the former in rudimentary recycling centers in developing countries can release the latter, with devastating consequences.

"The U.S. is way behind in this area compared to Europe and even parts of Asia," said Julie Schoenung, associate professor of chemical engineering and materials science at UC Davis and one of the authors of the article with three colleagues at UC Irvine: Oladele Ogunseitan, professor of health sciences; Jean-Daniel Saphores, associate professor of civil and environmental engineering; and Andrew Shapiro, an associate adjunct professor of electrical engineering and computer science.

A few states, including California, have strict rules and recycling

mandates. But manufacturers face a patchwork of state regulation across the country. In the European Union, by contrast, there are longstanding directives that govern electronics recycling, based on the concept of "extended producer responsibility." The manufacturer of a product is responsible for ensuring that the product is properly recycled when its useful life is over. With strong recycling mandates, a flourishing recycling industry has grown up.

China has recently passed laws to encourage electronics recycling and ensure that it is done properly, Schoenung said.

Without clear recycling options, many U.S. consumers may simply put that old phone in a drawer and forget about it. Schoenung and her colleagues recently estimated that there are as many as 1.5 million tons of electronic waste sitting in homes and garages across the U.S.

A new act now before the U.S. Senate attempts to address the problem. The Electronic Device Recycling Research and Development Act would fund research and demonstration projects, education efforts and research into alternatives to toxic or hazardous materials.

The bill also calls for e-waste education targeted to undergraduate engineering students, but engineers also need to learn from other disciplines such as toxicologists, ecologists and economists, Schoenung said. Educational efforts should include graduate programs, where there are greater opportunities for interdisciplinary work, she said.

"The recognition by Congress is important, but we are maybe starting a little too far back in doing research and analysis," Schoenung said. There is much that can already be learned from the European experience, she said.

Provided by UC Davis (news : web)

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