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Where computers go to die -- and kill

More than 50 percent of our recycled computers are shipped overseas, where their toxic components are polluting poor communities. Meanwhile, U.S. laws are a mess, and industry and Congress are resisting efforts to stem "the effluent of the affluent."

By Elizabeth Grossman

Apr. 10, 2006 | A parade of trucks piled with worn-out computers and electronic equipment pulls away from container ships docked at the port of Taizhou in the Zhejiang Province of southeastern China. A short distance inland, the trucks dump their loads in what looks like an enormous parking lot. Pools of dark oily liquid seep from under the mounds of junked machinery. The equipment comes mostly from the United States, Europe and Japan.

For years, developed countries have been exporting tons of electronic waste to China for inexpensive, labor-intensive recycling and disposal. Since 2000, it's been illegal to import electronic waste into China for this kind of environmentally unsound recycling. But tons of debris are smuggled in with legitimate imports, corruption is common among local officials, and China's appetite for scrap is so enormous that the shipments just keep on coming.

In Taizhou's outdoor workshops, people bang apart the computers and toss bits of metal into brick furnaces that look like chimneys. Split open, the electronics release a stew of toxic materials -- among them beryllium, cadmium, lead, mercury and flame retardants -- that can accumulate in human blood and disrupt the body's hormonal balance. Exposed to heat or allowed to degrade, electronics' plastics can break down into organic pollutants that cause a host of health problems, including cancer. Wearing no protective clothing, workers roast circuit boards in big, uncovered woklike pans to melt plastics and collect valuable metals. Other workers sluice open basins of acid over semiconductors to remove their gold, tossing the waste into nearby streams. Typical wages for this work are about $2 to $4 a day.

Jim Puckett, director of Basel Action Network, an environmental advocacy organization that tracks hazardous waste, filmed these Dickensian scenes in 2004. "The volume of junk was amazing," he says. "It was arriving 24 hours a day and there was so much scrap that one truck was loaded every two minutes." Nothing has changed in two years. "China is still getting the stuff," Puckett tells me in March 2006. In fact, he says, the trend in China now is "to push the ugly stuff out of sight into the rural areas."

The conditions in Taizhou are particularly distressing to Puckett because they underscore what he sees as a persistent failure by the U.S. federal government to stop the dumping of millions of used computers, TVs, cellphones and other electronics in the world's developing regions, including those in China, India, Malaysia, the Philippines, Vietnam, Eastern Europe and Africa.

Because high-tech electronics contain hundreds of materials packed into small spaces, they are difficult and expensive to recycle. Eager to minimize costs and maximize profits, many recyclers ship large quantities of used electronics to countries where labor is cheap and environmental regulations lax. U.S. recyclers and watchdog groups like Basel Action Network estimate that 50 percent or more of the United States' used computers, cellphones and TVs sent to recyclers are shipped overseas for recycling to places like Taizhou or Lagos, Nigeria, as permitted by federal law. But much of this obsolete equipment ends up as toxic waste, with hazardous components exposed, burned or allowed to degrade in landfills.

BAN first called widespread attention to the problem in 2002, when it released "Exporting Harm," a documentary that revealed the appalling damage caused by electronic waste in China. In the southern Chinese village of Guiyu, many of the workers who dismantle high-tech electronics live only steps from their jobs. Their children wander over piles of burnt wires and splash in puddles by the banks of rivers that have become dumping grounds for discarded computer parts. The pollution

has been so severe that Guiyu's water supply has been undrinkable since the mid-'90s. Water samples taken in 2005 found levels of lead and other metals 400 to 600 times what international standards consider safe.

In the summer of 2005, Puckett investigated Lagos, another port bursting with what he calls the "effluent of the affluent." "It appears that about 500 loads of computer equipment are arriving in Lagos each month," he says. Ostensibly sent for resale in Nigeria's rapidly growing market for high-tech electronics, as much as 75 percent of the incoming equipment is unusable, Puckett discovered. As a result, huge quantities are simply dumped.

Photographs taken by BAN in Lagos show scrapped electronics lying in wetlands, along roadsides, being examined by curious children and burning in uncontained landfills. Seared, broken monitors and CPUs are nestled in weeds, serving as perches for lizards, chickens and goats. One mound of computer junk towers at least 6 feet high. Puckett found identification tags showing that some of the junked equipment originally belonged to the U.S. Army Corps of Engineers, the Illinois Department of Human Services, the Kansas Department of Aging, the State of Massachusetts, the Michigan Department of Natural Resources, the City of Houston, school districts, hospitals, banks and numerous businesses, including IBM and Intel.

Under the Basel Convention, an international agreement designed to curtail trade in hazardous waste, none of this dumping should be happening. Leaded CRT glass, mercury switches, parts containing heavy metals, and other elements of computer scrap are considered hazardous waste under Basel and cannot be exported for disposal. Electronics can be exported for reuse, repair and -- under certain conditions -- recycling, creating a gray area into which millions of tons of obsolete electronics have fallen.

The U.S. is the only industrialized nation not to have ratified the Basel Convention, which would prevent it from trading in hazardous waste. The U.S. also has no federal laws that prohibit the export of toxic e-waste, nor has the U.S. signed the Basel Ban, a 1995 amendment to the convention that prohibits export of hazardous waste from Organization of Economic Cooperation and Development member countries to non-OECD countries -- essentially from wealthy to poorer nations. While this policy is intended to spur reuse and recycling, it also makes it difficult to curtail the kind of shipments BAN found in Lagos.

Despite a growing awareness of e-waste's hazards, the U.S. government, says Puckett, has done nothing in the past several years to stem the flow of e-trash. Given the Bush administration's reluctance to enact or support regulations that interfere with what it considers free trade and the difficulty of monitoring e-waste exports, the shipments continue. "Follow the material, and you'll find the vast majority of e-waste is still going overseas," says Robert Houghton, president of Redemtech Inc., a company that handles electronics recycling for a number of Fortune 500 companies, including Kaiser Permanente. As Puckett says, "Exploiting low-wage countries as a dumping ground is winning the day."

Over a billion computers are now in use worldwide -- over 200 million in the United States, which has the world's highest per capita concentration of PCs. The average life span of an American computer is about three to five years and some 30 million become obsolete here each year. According to the International Association of Electronics Recyclers, approximately 3 billion pieces of consumer electronics will be scrapped by 2010. Overall, high-tech electronics are the fastest-growing part of the municipal waste stream both in the U.S. and Europe.

The EPA estimates that only about 10 percent of all obsolete consumer electronics are recycled. The rest are stored somewhere, passed on to second users, or simply tossed in the trash. The EPA's most recent estimate is that over 2 million tons of e-waste end up in U.S. landfills each year. As Jim Fisher of Salon reported in 2000, a toxic stew from discarded computers leaches into groundwater surrounding landfills.

Current design, particularly of equipment now entering the waste stream, makes separating electronics' dozens of materials labor-intensive. "Almost every piece of equipment is different," says Greg Sampson of Earth Protection Services, a national electronics recycler. The process almost always involves manual labor and, once the electronics are dismantled, sophisticated machinery is required to safely separate and process metals and plastics.

The fragile CRTs with leaded glass used in traditional desktop monitors and TV screens pose a particular recycling challenge. Metals are the easiest materials to recycle and the most valuable -- circuit boards typically contain gold, silver and other precious metals. Plastics are the peskiest, as many different kinds may be used in a single piece of equipment and markets for recycled plastics are far less established than those for scrap metals.

E-Scrap News, a recycling industry trade magazine, features about 950 e-scrap processors in its North American database -- a list that doesn't include nonprofits or reuse organizations. And not all electronics recyclers offer the same services. Some dismantle the equipment and recover materials themselves. But many simply collect equipment and do initial disassembly, then contract with others for materials recovery.

According to the International Association of Electronics Recyclers, this business now generates about $700 million annually in the U.S. and is increasing steadily. Most recyclers charge fees to process equipment. But essentially profits come from the sale of materials recovered or by selling equipment or components to those who will do so. There's also a speculative aspect to the business, especially when the scrap metal market is booming and the value of recyclable circuit boards increasing -- it reached an all-time high in January 2006 at $5,640 a ton.

Some recyclers -- mostly smaller shops -- acquire used equipment at surplus property auctions, on eBay or other such resale outlets, then resell equipment whole or in parts by the pound to what Houghton calls "materials brokers" and "chop shops." One batch of equipment may end up being sold to a series of brokers before it reaches a materials processor, and much of what these brokers deal in ends up overseas where costs are lowest. "If a company is buying your electronic scrap or untested equipment," rather than charging for this service, "it's highly likely that it's going overseas," says Sarah Westervelt of BAN.

In 2000, Salon's Fisher noted that U.S. computer manfacturers bucked the European trend of instigating convenient buy-back programs for used computers -- a resistance that continues today. Since 2000, the Silicon Valley Toxics Coalition, an environmental group, has maintained a "report card" of computer makers' environmental progress in recycling and manufacturing. In its most recent report card, it notes that the "most alarming trends in the electronics industry in the United States continue to be staunch opposition to producer take back programs."

Currently, there is no consistent, industrywide or government program to certify or license electronics recyclers. As a result, says Houghton, "It's extremely difficult to peel back the onion far enough to find out where the equipment goes. It may change hands two, three or four times before it leaves the country." And, he explains, "The cost of shipping a 40-foot container full of computers, relative to the value of the equipment," even at scrap prices, "is pretty low." With dealers from China to Eastern Europe and Africa ready to buy used electronics for scrap or reuse, and U.S. domestic transportation and recycling costs high, it's actually more profitable to load up a container and send it to Nigeria or Taizhou than it is to process equipment at home.

So traveling the seas in the shadows of legitimate high-tech exports are huge containers that may hold as many as 1,000 used computers. They're loaded on ships at East Coast and Gulf Coast ports in the U.S. for Atlantic crossings, or at European ports, including Felixstowe, Le Havre and Rotterdam, arriving in West Africa by way of Spain. Others cross the Mediterranean from Israel and Dubai, or travel Asian Pacific routes from the U.S., Japan, Taiwan and Korea.

Compounding the difficulty of tracking an individual computer is the fact that several different companies -- including freight consolidators at both exporting and importing ports, some located in countries distant from both buyers and sellers -- are responsible for moving these goods. A recycler in Texas may well be unaware of who is unloading or receiving his goods in China or Africa. Many international freight shippers make it easy to track a whole container -- just punch the number into their Web site -- but information about who's shipping what is not public information.

Even in Europe, where e-waste exports are regulated, illegal shipments slip through. "From our work, we have no doubt that there are improper shipments of waste," says Roy Watkinson of the U.K. Environment Agency, which in October of 2005 reported that 75 percent of the containers it had inspected that month contained some illegal waste, including e-scrap. A European group, IMPEL, a network of environmental regulators, has been monitoring this trade, and has found ships loaded with damaged computer equipment sailing out of Wales bound for Pakistan in containers marked "plastics."

According to accounts by Lai Yun of Greenpeace China and Mark Dallura of Chase Electronics in Philadelphia, and news reports from China, corruption is common among customs officials there. Dallura told the Washington Post in 2003 that he ships discarded computers to China via Taiwanese middlemen. "I sell it to [the Taiwanese] in Los Angeles and how they get it there is not my concern," Dallura said. "They pay the customs officials off. Everybody knows it. They show up with Mercedeses, rolls of hundred-dollar bills. This is not small-time. This is big-time stuff. There's a lot of money going on in this." Today, loads of e-scrap continue to enter the country despite the Chinese government's official crackdown on these imports.

In an attempt to find out how computers belonging to the U.S. and state government agencies -- including one from a Wisconsin school district -- might end up in Lagos, Nigeria, I tried to get to the bottom of what happens to the over half-million computers the federal government disposes of each year.

Much of the federal government's used but usable computer equipment (including cellphones) is placed with another government agency or donated to a school or community nonprofit (usually chosen and vetted by an individual agency office). The rest (the exact numbers are not known) goes to the General Services Administration -- the agency that deals

with the procurement, use and disposal of government property -- for public auction. State governments work similarly, usually through state surplus property offices or equivalent programs. No one I consulted had any estimate of how many computers state and local governments discard annually. What was clear is that the ultimate fate of significant quantities of government electronics is poorly documented.

Equipment left after these donations and sales is sent out for recycling. Some federal and state agencies choose their own recyclers. Some federal agencies send used computers to the recyclers awarded contracts under the EPA's electronics recycling program, called Recycling Electronics and Asset Disposition services. A number send equipment to the Federal Prison Industries' computer recycling facilities, which dismantle equipment and send parts on for materials recovery. Many state and local governments (and school districts) put their electronics recycling contracts out for bid, often choosing the company that charges the least to handle and process the equipment. This itself is a red flag. "If there's no charge," or prices are extremely low, especially for monitors, cautions Sampson of Earth Protection Services, "chances are high equipment is being recycled using cheap labor or by less than optimum methods."

What struck me about the GSA and other public auctions was the lack of oversight, both in terms of where used equipment might end up -- potentially creating environmental hazards -- and in terms of data security. BAN had scrapped hard drives that it purchased in Lagos analyzed by the Swiss firm NetMon, which found correspondence from staff at the World Bank and from Wisconsin's Child Protective Custody Agency, among others. As a result of chaotic recycling, "There's a definite concern for our security," says Eric Karofsky, senior research analyst with AMR Research, a firm that analyzes business supply chains.

Recent GSA auctions have included computers belonging to the Census Bureau, the South Texas Veterans Health Care System, the Border Patrol, the Federal Aviation Administration and the U.S. Department of Commerce. Anyone over 18 from a country the U.S. does business with, who has a valid credit card, can buy at these auctions, many of which are conducted online. Auction participants are hard to identify as their bids are recorded only by user names, but it's unlikely that anyone is buying a load of 75 used CPUs for personal use. And there are thousands of waiting online buyers. In the U.S., a laptop sells on eBay about every 45 seconds, reports senior category manager Stephani Regalia, who helped launch eBay's ReThink program devoted to selling used electronics.

The GSA keeps records of who's bought equipment, but does not track what happens to equipment that's been sold, nor does it ask buyers why they're purchasing the electronics. "Why would we?" asks a GSA staffer in Boston. The result is that at both the state and federal level, large quantities of electronics are purchased by brokers, auctioneers and individual dealers who often sell the equipment for export.

For example, one company that has bid at GSA auctions, CTBI Co., of San Antonio, also works as the Morsi Corp. Mike Hancock, the company's proprietor, tells me that he sells working equipment to overseas buyers, including those in Indonesia. The scrap, he says, goes to China, Pakistan and Canada, but another company handles those transactions, so he doesn't track things further. As far as he's concerned, none of his scrap has ended up in Nigeria. "I don't do business in Nigeria," Hancock says. "There are too many bad credit cards there."

One electronics recycler that does do business in Africa is Arizona-based ScrapComputer.com. The staff person I spoke to (who would not give me his name), in the company's Chicago office, says nothing ends up in landfills, and that working equipment is refurbished for schools or sold on eBay. But it also exports computers to India and China where, the staffer says, functional CRTs are remade into TVs. ScrapComputer also sends equipment -- all working, I am told -- to Malaysia and Egypt, and to West African countries including the Congo. Clearly, this is not the only company selling into Africa, but given the fluid nature of the business, it's extremely difficult to pin down which recyclers knowingly sell e-scrap with a blind eye to dumping and unsound recycling methods.

Still curious to know how a computer owned by Wisconsin's Wauwatosa School District ended up in Lagos, I tracked down the office, SWAP (Surplus With a Purpose), that handles used computers for Wisconsin school districts. Tim Sell, SWAP's business manager, tells me that SWAP -- part of the University of Wisconsin -- accounts for everything it handles. He says equipment not refurbished for donations or placed in state offices goes to the Wisconsin State Corrections Department's computer recycling facilities, which refurbish and recycle used computers.

But he bemoans the legal loopholes that make e-scrap so hard to track. "Recyclers lie to us," he says, explaining that despite assurances, equipment and parts probably do end up being handled in ways SWAP would rather it did not. When I ask about the computer in Nigeria, Sell tells me he knows that individual customers buy equipment from SWAP and stockpile it for sale to bulk buyers either here or overseas, including those who buy to sell in Africa. With so many unknowns and loopholes in the current system of accounting for used electronics sent for recycling, "I don't know how you're going to stop

these exports 100 percent," says Sell.

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The U.S. may be one of the world's biggest consumers of high-tech electronics, but unlike the European Union or Japan, the U.S. has no national system for handling e-waste. Unless a state or local government prohibits it, it's currently legal to dump up to 220 pounds a month of e-waste, including CRTs and circuit boards, into local landfills. Several dozen states have introduced e-waste bills, and a handful of U.S. states -- California, Maine, Maryland, Massachusetts, Minnesota, Washington -- have recently passed substantive e-waste bills, some of which bar CRTs from their landfills. E-waste bills have also been introduced in the House and Senate, but neither would create a national collection system.

The export of e-waste has been discussed in Congress but no legislation to regulate this trade has yet been introduced. Matt Gerien, press secretary to Rep. Mike Thompson, D-Calif., who has co-sponsored an e-waste bill in the House, says, "Ironically, what brought Representative Thompson to this issue are these export problems." But neither the bill that Rep. Thompson has co-sponsored with Rep. Louise Slaughter, D-N.Y., nor the one introduced by Sens. Ron Wyden, D-Ore., and Jim Talent, R-Mo., would deal with exports.

Meanwhile, says Laura Coughlan of the EPA's Office of Solid Waste, the Bush administration has drafted legislation that would allow the U.S. to ratify the Basel Convention, but is waiting for final clearance for transmittal to Congress. And the Ban amendment, which essentially prohibits sending e-waste from wealthy to poorer countries, "has created issues for U.S. ratification of the convention," says Coughlan, who explains that no "U.S. administration has supported ratification of this amendment, and the U.S. government has been unable to reach consensus with domestic stakeholders."

Legislation in Europe has made electronics recycling mandatory throughout the E.U., as it is in Japan and some other countries. Companion legislation requires the elimination of certain toxics -- among them lead, cadmium and hexavalent chromium used in solder, batteries, inks and paints -- from electronic products, and given the global nature of the high-tech industry, these new materials standards could effectively become world standards. Many such changes have already been made and more are in the works, but the old equipment now being discarded remains laden with toxics.

As U.S. lawmakers, manufacturers, environmental advocates, waste haulers and recyclers struggle to find a way to collect the nation's high-tech trash, Americans are left with what policymakers are fond of calling a patchwork of regulations and recycling options. This makes things as confusing for manufacturers as it does for consumers and recyclers. "At some point, the 'feds' will have to step in and harmonize things," says Ted Smith of the Silicon Valley Toxics Coalition.

In 2005, the EPA held an electronics recycling summit. Among the issues participants grappled with, and on which there is no industrywide or national policy, are that of certifying electronics recyclers and exporting electronic waste. Complaints were voiced about the difficulty of dealing with products designed with materials that make recycling complicated and expensive. But loudest of all were complaints that the U.S. had too many confusing and uncoordinated recycling efforts. A year later, a few more state laws regulating e-waste have been passed but little else has been done to stop the steady stream of used computers, cellphones and TVs that are ending up overseas, in dumps, polluting soil, water and air.

-- By Elizabeth Grossman

Salon Media Group, Inc
101 Spear Street, Suite 203
San Francisco, CA 94105
Telephone 415 645-9200
Fax 415 645-9204