

# Product Redesign, E-waste and Nigerian Burning

by Paul Palmer

The world has been awash in advanced, technical and scientifically based environmental awareness for 50 years at least. The scientific fields associated with the ecology of plants and animals have burgeoned and resulted in dozens of scientific journals. Whole tides of ecological theory have arisen, contended with each other and been resolved, often making use of complex mathematical models. Sweeping laws have been passed protecting species of birds, rodents, fish and plants. We have all been part of this gusher of new knowledge and concern.

So it is only natural that we would assume that all the major fields of environmental progress would at least be studied, reported on by scientists and subjected to sophisticated analysis, even if the politics of greed prevent progress. It is hard to believe that there is one huge area of environmental agitation which still operates on the most primitive basis, free of any scientific theory or discussion, one that has not only made no progress in its underpinnings in the last 50 years but has actually regressed to a level that can only be called juvenile. I refer to conservation of the resources that are consumed in creating and using products.

Many of the resources are of a commodity type, such as minerals, metals, agricultural products or fuels. Others are *clean* water, *clean* air, human labor, human intelligence, forests, oceans, rivers, mountains, species diversity and intact ecosystems. Most of the inputs are components of a diminishing former commons, now stolen, roped off, bulldozed, sterilized and generally exhausted and carved up. The reigning socioeconomic theory justifies all this exhaustion and destruction by a variety of theories based on individual freedom to grab any and all of these inputs for any purpose whatever, no matter how transitory or specious.

Descending to the specific: any citizen has the absolute right to move his perfectly usable or even new couch onto the curb for a garbage truck to take away simply because he wants a different model of a

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## Garbage companies are the main recyclers.

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ing a payment for it, the police will arrest him. The right to destroy useful resources is not limited to the greasy polluter or the evil chemical corporation. It pervades the mentality that rules our American society and is often applied by citizens who view the right to destruction as a basic freedom. Just read in your newspapers the widespread venom directed by citizens against gypsy haulers taking recyclables out of garbage cans. How many foreclosed houses are defended by sheriffs against occupation by homeless people?

The sole approach to mitigation of this legal horror that you will encounter is called recycling. It takes many forms but in all cases it is characterized by being the lowest form of reuse that can be devised. The defining rule that it embodies is this: the right to discard and destroy is not be opposed in any way. All that is required is that after the orgy of destruction is complete, the recycling approach will then, and only then, take the degraded product of the discard, of the poor design, of the shoddy products, of the chemical waste, and it will attempt to find a last minute, desperate way to recapture the bare materials, the least valuable components, if it can, and if it fails, the dump is then a perfectly acceptable final repository.

The recycling impulse is so wedded to the dump that in almost all cases, the same company controls both the recycling and the dumping. Garbage companies are the main recyclers. The “progressive” legal system promotes the recycling of the smashed lumber, concrete and piping from the demolished, foreclosed house but the same law also protects the bank that locks out the homeowner from a high level use of the intact house.

The foregoing discussion emphasizes the loss of scarce resources originating in the diminishing commons. When the products being discarded are themselves dangerous in some way, the story takes on a further interest.

For 50 years now the nuclear industry has cavalierly created a radioactive and extremely poisonous excess from the generation of electrical energy. Because they know how to make money by the front end of their industry, where the electricity is generated, they pooh-poohed any concern with the fate of

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slightly different brown color. Or for no reason. He has the right, under current law, to insist that no person is allowed to make use of that couch for any purpose but that it must be destroyed and buried in a dump. If he wants to.

The law aggressively protects his arbitrary decision to destroy while offering no solace whatsoever to the horrified onlooker who happens to have a need for that couch. If that onlooker tries to insist on his right to make use of a discarded item, even offer-

their dangerous discards. Since the right to discard is guaranteed by law, they could simply slot their radioactive waste into the prevailing obsession with dumping. So for decades, many tens of billions of dollars of public monies have been expended to find a way to throw away radioactive trash.

There is no difference in principle between this quixotic quest and the couch on the curb, but the public does not see the parallel. At no time, with all of that money being spent, was there a single dollar

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### **Their only response to the coming shortage is to find new sources of rare earths...**

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spent on questioning the basic principle that any citizen has the right to create a product that they demand the public take away for them. The right to destruction and dumping is ironclad. Even this, the most extreme example of a dangerous discard, has not made a dent in the right to discard.

Another interesting example is when the input source is critically exhausted. We see this with the example of rare earths which are certain chemical elements that have similarities in the periodic table. Not all are truly rare, but they are all difficult to win from their ores. The rare earths turn out to have very special electrical, magnetic and optical properties that make them irreplaceable in thousands of critically important technical products on which we all depend, usually without our realizing it.

It turns out that about 30% of the known sources of rare earths are in China with a few more in California and elsewhere. However, China accounts for about 90% of world production. So long as China was a primitive, agricultural society with no use for rare earths, there was no problem. Now that China has a raft of uses for all the earths, they are planning to cut off their sales to the rest of the world. This has precipitated a flurry of acquisitive responses.

Starting a resource war with China is no longer as attractive as it once appeared, but there are plenty of warriors with plenty of bluster in this direction nonetheless. To this writer, the solution to the problem is obvious, but to a country steeped in the right to discard under all circumstances, the blinders are so firm that no change in design or discard practices can ever be allowed. Every cell phone, every magnet, every catalytic converter, every broken laser or lens, has the absolute right to be thrown into a dump, along with the rare earths they contain. Their *only* response to the coming shortage is to find new sources of rare earths which can then in turn end up in dumps. Molycorp Company plans to reopen an old mine in California. The right to dump trumps even emergencies.

Recently Free Speech Radio News (FSRN) reported on the situation in Nigeria, where electronic discards are being burned for their metals, causing

extensive health injuries. In the inimitable style of the environmental movement, all of the emphasis is placed on the trivial and the superficial (I am not minimizing the health effects) which serve to energize the public to join and pay dues to the activist environmental organizations but always being careful to not solve the problems in any deep way. Read this precis:

One of the main objectives of the Rio+20 Conference is to ensure environmental protection through the creation of green jobs **with low carbon emissions**. That could offer greater opportunity in places like Nigeria, where thousands of unemployed people make a living by **recycling electronic waste through burning**. The process ... leads to **greenhouse gas emissions...**

The e-waste includes items like computers, mobile phones and television sets and is often exported illegally from developed countries to Africa. FSRN's Sam Olukoya reports from Lagos.

"More than **one million tons of e-waste** enters Nigeria each year... The large market looks like a wasteland of broken down electronic items and their parts... Kasim Suleyman breaks open a refrigerator compressor in order to extract the aluminum and copper wire inside of it... Suleyman says the rest gets burned in one of several fires blazing around the market... 'When we melt it, we'll come to the finished goods. For if it did not go to the finished goods nobody would buy it... When we set the fire we'll go outside.' Choking black smoke fills the air...

"The workers who burn the e-waste, average three dollars a day by selling the items extracted from the fire. Recycling e-waste in this manner is a source of livelihood for thousands of people across Africa...

"Africa is romancing with death by trying to make a living out of e-waste...even the ash, and the refuse, are very dangerous, so we tell them...don't burn, burning **also leads to climate change.**"

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For Africa to meet part of the objectives of the Rio+20 United Nations Conference...experts... said **developed countries must limit their illegal (export) of e-waste**, while African leaders **should improve waste recycling** methods. Others suggest manufacturers should take the lead in **using less toxic components** and **pay for e-waste recycling**.

This author runs the Zero Waste Institute which advocates changing the design of all of society's and industry's products and processes in keeping with a new principle: design all products for perpetual reuse. Discard nothing, making recycling a non-issue. It turns out that this goal is not only feasible, it would be (if it were to be adopted wholeheartedly instead of being fiercely opposed) actually easy to put into practice. Many actual designs are presented on the website showing how commodity products

can be designed for perpetual reuse and how commercial and industrial processes can be redesigned to foster such reuse.

Take note: in the absence of a comprehensive change in social practices, especially the ways in which the newly designed products are used, merely tweaking some small aspect of a product will accomplish nothing. Many critics founder on this point, imagining that all remains the same except for a small change in a product. For example, many commentators have suggested that all that is needed for plastic products is to make them biodegradable, so that they can continue to be easily discarded.

Then under some conditions, they will be degraded or used by nature. However, that is not reuse. That is merely disguised destruction. Long term reuse of plastic parts, while achievable, is a far more complex challenge requiring changes in the way plastic is designed into products. Also, designing packaging for perpetual reuse is a powerful principle, but unless the social methods of returning packaging for refilling to someone who needs that packaging are put into place, the new designs will have no effect. Without the accompanying change in the way the package is used, all you would have is more expensive and better built packaging to discard.

Note then, the ways in which this report on e-waste burning emphasizes the trivial. In this analysis, I take the position that redesigning electronic manufacture in all its aspects is the only way to create a sensible system of total reuse which eliminates the need for burning entirely.

We need to draw attention to the recent, nationwide change in how electronic goods are handled in the US. First, in the 1990s, there was a pounding campaign, mostly by the Basel Action Network, screaming about the health effects of burning waste electronics in China, Uganda and Nigeria, detailing with videos and photos and on-site visits the horrible effects of breathing the smoke from burning plastics. Americans were terrorized—no other word suits it—with the awful reports. A drumbeat of the need for Americans to do something new and innovative with their electronic excesses went on for several years and it was effective. Remember, the motivation was to change the way in which electronics were recycled (and keep in mind that this report says nothing has changed).

# ToxCat



EU & UK POLITICIANS DUMP ON THE CITIZENS

ToxCat provides information on the technical, scientific and medical aspects of toxic issues in an understandable language. Communities Against Toxics, P.O. Box 29, Ellesmere Port, Cheshire CH66 3TX United Kingdom, +44(0)151 339 5473 [www.communities-against-toxics.org.uk](http://www.communities-against-toxics.org.uk)

The recyclers (meaning the rich garbage companies) were at the forefront of the drumbeat for change. Citizens who were reported to have garages full of old electronics that still worked, and so were reluctant to discard them, were another factor. Bills were introduced into legislatures and the term e-waste became commonplace. Many versions were tried. Sometimes the government would pay for each piece. Sometimes recyclers needed to be officially certified. But the basic parameters were always the same and revolved around a collection event with these points emphasized:

1. The collection is official.
2. The collection represents progress.
3. Your waste will be properly recycled by licensed recyclers.
4. The collection is taking place at this specified location.
5. The collection is taking place at this specified time.
6. The collection is organized by this specified organization.
7. The price for bringing in your electronic goods is this specified charge.

The first three were optional. The next four were mandatory.

That's it. That was all. No other parameters. Do you notice what is missing? If you don't, don't feel bad. No one else did either. No one ever asked the gnawing question at the very heart of this program. None of the organizers and none of the officials and none of the participants ever wondered what was going to happen to the electronic goods that was different from sending it to the same places the horror campaign had identified. That pregnant phrase "proper recycling" allayed all the fears.

The recyclers were often paid by the government in ways that had not been done before. More money for recyclers (garbage companies). More street cred. More respect for recycling. More metastasis of the principle of destruction into the operations of government. More participation by upstanding groups such as boy scouts or the police, lending even more respectability. A real coup. And those "proper recyclers" who were going to save the Chinese and African villagers? No one could identify them. But then no one asked.

This report by FSRN tells us what was going on under the hood. The same old breaking and burning and illness. But a powerful industry had pulled the wool over the eyes of the public. How does the FSRN report demonstrate the low level of discussion in this important field?

Note the repeated invocation of climate change. Those warnings are stated by good, responsible people who want to contribute to environmental progress, and they know climate change is in the air (pun intended). But counting up carbon dioxide from electronic burning is futile. There could surely not be enough carbon dioxide from the burning of PVC insulation, the main flammable plastic, in a year to compare to the carbon dioxide emitted by a single coal burning electric plant in one day. Yes, everyone can reduce their CO<sub>2</sub> emissions but compared to the egregious waste of valuable resources, which is not mentioned, this effect is insignificant.

The experts are further quoted as saying electronic exports should be reduced. Aside from the economic effect of throttling down the work that thousands of Africans depend on, how could this happen? It is true that Zero Waste redesign would have this effect but none of these experts or officials is referring to that. This is no more than pious hope. In fact, under the present regime of egregious wasting in the developed world, the amount of e-waste going to Africa is going to increase, not decrease. If the Nigerian government actually wanted to process less electronics, they could simply reduce their own imports and have the same effect. But they don't.

The experts mention reducing toxic components. This is a mantra that the environmental movement has incorporated into its dogma but what does it mean here? The worst effects come from the burning of insulation on wires or other plastics such as circuit boards. I assume that plastic cases are removed before burning. But these things are not toxic. They can sit there forever and bother no one. It is the burning that creates toxicity, not the choices of manufacturers. Of course a Zero Waste approach would reuse components instead of burning them but the recyclers and the US governments (federal and state) have decided that that cannot be allowed.

The last plea offered is for manufacturers to pay. But pay for what? This unthinking plea comes out of a movement called the campaign for Extended Producer Responsibility (EPR) that has arisen lately as a convoluted way to build recycling into a market force by handing responsibility for recycling to manufacturers. As with all the other disconnected pleas for change offered in this report by the "expert" players, it has no bearing on what is done with the goods.

Nowhere has a claim been made that charges or prices are central in deciding what actually gets done with the goods. If manufacturers are forced to kick in for the recycling, the main benefits will flow to

cities and to the garbage industry, leaving the Nigerian villagers unchanged. San Francisco and Oakland, for example, in their advocacy of EPR make no secret that the main advantage for the city is to shift the cost of garbage management from the city to someone else.

In fact, the domestic US campaign for EPR is a microcosm of the problem with Nigerian burning of e-waste. The entire discussion of EPR revolves around who has responsibility for used goods and therefore who pays. What happens to goods is the forgotten issue, of no concern to anyone. It is always assumed that recycling will continue unchanged.

To sum up, the reason that burning continues to make many villagers and native "recyclers" sick is

because there is no alternative way known for recovering value and no group in the developed world cares enough to make a change. The very design of the electronic goods demands that the lowest level of re-

use is all that can be accommodated. The burning of electronics in Nigeria was decided when the original designers in the Apple or Samsung factory decided that profit and convenience and technical performance were the only factors that were allowed into their calculations. The concept of "proper recycling" is merely a word game, a trap for the uncaring. Yes, the goods could be simply buried in the ground with no recovery at all, or used to fill up the Grand Canyon or rocketed into Old Sol, as recyclers repeatedly suggest. But Nigerians are surviving economically, illness or not, and so they will demand access to the goods. The logic is ineluctable. What is needed across the board is a revolution in design, beginning with the abolition of the Right To Destroy.

This problem is at the same time a labor issue.

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If the Nigerians workers were paid, let's say, 10 times as much for their dangerous work, would that make some outsiders feel better? What if Nigerian workers refused to work simply for what they could sell "finished goods" for but demanded an incoming-piece charge as well? Clearly there are many other impoverished villagers in other countries who would jump at the chance to earn a wage by trading in their health.

This is an example of how social design is incorporated into product design. Unless product designers could count on the desperation of poor workers, they could not continue to design for abundant discard. The Zero Waste approach would depend essentially on technically trained and professionally paid personnel to carry out the tasks of reuse that would be built into products designed for reuse.

Some of those personnel could even be trained Nigerians.

One after another, the deep discussions by environmentalists, the recommendations of experts, the activities of recyclers and the policies of government are all seen to be ineffective, misplaced and generally environmentally worthless. The reality is that resource destruction is an official policy that is never challenged. Many of the social activist workers in this field are entirely well intentioned but the policies are so entrenched in law, so validated in popular assumptions (“garbage will always be with us” — “recycling is the ultimate solution”) and so implicit in accepted design that what passes for deliberation ends up being—as this article started out by saying—juvenile. Nothing short of a resource crisis, it seems, can possibly derail this train of destruction and even that will at first be incorporated into a market based opportunity, as shown by the way rare earths, fresh water, food and forests are now being treated.

Yahoo Finance via Marketwire, July 2012. “Currently China produces about 95% of global rare earth supplies.” <http://finance.yahoo.com/news/china-raises-rare-earth-exports-122000639.html>

Forbes, June 2012 “Uncertainty about the level of rare-earth exports from China and the future global supply of these critical raw materials was heightened by the white paper, which said that China has just 23% of the world’s rare-earth minerals, not the 36% that the U.S. has estimated.” <http://www.forbes.com/sites/jack-perkowski/2012/06/21/behind-chinas-rare-earth-controversy/>

FSRN report (incomplete; listen to audio file downloadable at same location): <http://fsrn.org/audio/nigeria-electronic-waste-harms-environment-and-workers/10482>

The Zero Waste Institute <http://www.zerowasteinstitute.org>

Fraud in e-waste recycling in California. “By paying more than \$320 million to collect and recycle computer monitors and televisions, the state has built a magnet for fraud totaling tens of millions of dollars.”

<http://www.sacbee.com/2010/07/18/2897609/californias-pioneering-e-waste.html#ixzz16wy4qn6T>

Shifting costs away from cities. <http://www2.oaklandnet.com/oakcal/groups/pwa/documents/report/oak025375.pdf>

My plea for advocacy is this: to make more of a difference in resource reutilization than all of the recycling in the world, we need to replace the legal Right To Demand Destruction with the Right To Demand Reuse. This would elevate the discussion of resources to an effective level. Would Rio+20 or any world conference ever consider such a thing?

Paul Palmer is the director of the Zero Waste Institute, <http://www.zerowasteinstitute.org>

#### References

<http://www.sciencemag.org/content/329/5990/377.1.short>

This requires a subscription to Science but a precis of the article can be found in the next reference.

<http://zerowasteinstitute.org/wp-content/uploads/2010/08/Newsletter-August-2010.pdf>

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