

## Green Purchasing Project Widens Reach

INFORM's focus on the toxic constituents of commonly used consumer and industrial products dates back to 1995, when research for *Toxics Watch* revealed that 6 trillion pounds of toxic chemicals enter commerce each year, dwarfing the millions of pounds of these substances contained in waste that are generally the target of state and federal regulation. Since then, and especially since the inception of our Purchasing for Pollution Prevention (P3) project in 2000, INFORM has been promoting "products for a sustainable future"—durable, reusable, and recyclable items that are free of (or contain less of) the most dangerous hazardous chemicals. To encourage the manufacture and use of such products, the P3 team focuses on government purchasing, working with states and localities to promote the purchase of nontoxic or less toxic versions of products ranging from vehicles to thermometers to lice medications.

### Driving Safe Product Designs

The idea behind the approach is simple. Federal, state, and local governments spend about one-quarter of this country's gross domestic product on items used to construct, operate, and maintain office buildings, highways, parks, prisons, hospitals, schools, and many other public facilities. Because of this purchasing power, many companies actually design their products to meet government specifications. By demanding less toxic products that can be reused and recycled, government agencies send a strong message to vendors that they are serious about buying the safest products available and finding alternatives to disposal in landfills

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## New Report: Cell Phone Collection Programs Critical but Underutilized

Walk down the street or ride on a bus or train and you're bound to see people talking into their cell phones. Like computers, cell phones have become a ubiquitous part of modern life. Millions of people own them, and they're continually being upgraded in favor of the latest technology. In fact, with most phones used for an average of only 18 months, you may wonder what happens to these devices after they've been replaced.

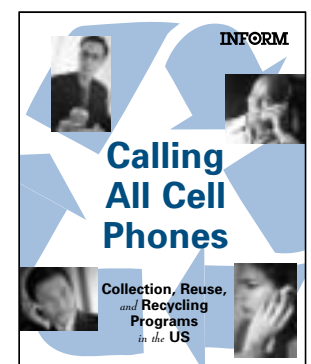
The fact is that most of the 100 million cell phones retired each year in the US are thrown in the trash. Smaller numbers get stored away in closets and drawers, but — if present trends continue — these, too, will eventually wind up in disposal facilities, where their combustion in incinerators and disposal in landfills pose risks to the environment and public health. In 2002, INFORM's *Waste in the Wireless World* reported on this growing waste stream: the number of cell phones discarded each year, the number stockpiled in people's homes, the many toxic components of cell phone waste, and the efforts being made to manage this waste both here and abroad.

*Waste in the Wireless World* identified two arenas for action to help solve the problem of cell phone waste: (1) programs that collect used phones for reuse and recycling and (2) product designs that facilitate reuse and recycling and reduce or eliminate the phones' toxic constituents. According to Eric Most, head of INFORM's cell phone project, since the release of that report, "advances in cell phone designs that facilitate reuse and recycling have been minimal, but collection programs are beginning to be launched across the country." In a new study, *Calling All Cell Phones: Collection, Reuse, and Recycling Programs in the US*, Most takes a look at two national cell phone collection programs and two regional initiatives, assessing how many used phones they are actually collecting and how effectively they are addressing this toxic waste stream.

### Drop in the Bucket

Cell phone collection programs recover used phones from consumers and either refurbish and resell them or recycle them, depending on their condition. "Unfortunately," says Most, "consumers are generally unaware of the collection programs that currently exist, and these programs are recovering only a tiny fraction of the millions of phones discarded every year." Of the hundreds of millions of phones retired and discarded from 1999 through early 2003, a mere 2.5 million were collected by four of the major programs investigated by INFORM — including the two largest, run by Verizon Wireless and the nonprofit Wireless Foundation.

INFORM found that the most effective programs have phone drop-off sites at retail stores, especially stores such as RadioShack that already sell wireless products. "Our



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# Letter from the President

## 2004: A Year to Vote With Your Purse



**2003** was certainly one of the most discouraging years in recent memory for millions of Americans who hope to see our country set an example in conserving the

world's natural resources and protecting the health of families and communities. Yet, despite the failure of our national leadership to put a priority on these goals — so fundamental to the long-term strength and security of our country — many initiatives at the state and local levels and innovations by forward-looking corporations offer reason for applause and hope.

While the federal government has been lax in regulating toxic chemicals, state governments are increasingly picking up the ball by insisting on products that are free of mercury, lead, and other highly toxic chemicals. INFORM began approaching state purchasers in 2000 to discuss the health risks of products that contain these substances and to offer information on safer alternatives. So far, 13

states, plus cities including San Francisco, Ann Arbor, and Erie County (Buffalo), NY, have availed themselves of our expertise, resulting in a stream of encouraging changes in purchasing practices. For instance:

- New York State has banned lead-containing traffic paint, ending the use of about 130,000 pounds of this neurotoxin a year.
- Illinois has instituted a pilot program to test lead-free ammunition at state police ranges, and is working to develop a statewide bid for “greener” cleaners following a very successful pilot project in several state buildings.
- The City of Ann Arbor is working with INFORM to complete a city-wide audit of its products and practices in order to adopt environmentally preferable alternatives wherever possible.
- Rhode Island, with INFORM's assistance, is revising all of its state purchasing contracts to eliminate mercury-containing products wherever possible.

At the same time, forward-looking cities are opting for clean-fuel vehicles, which can reduce the smog and

soot that are a major cause of asthma attacks in children and pose a cancer risk as well. Despite the higher costs of these vehicles and the resistance of diesel interests, INFORM's research has shown that more than a dozen heavy-duty diesel refuse fleets, including those in Fresno, Tulare, and Stockton (in California's highly polluted San Joaquin Valley), have begun the shift to much cleaner and quieter natural gas trucks, in addition to the 26 US fleets discussed in our 2003 study, *Greening Garbage Trucks*.

Corporations, too, are recognizing the expanding green market by introducing new products and services. These include Clean Energy, which has grown into the leading provider of natural gas refueling infrastructure; Toyota, with its pioneering 2004 hybrid electric Prius — just chosen the Motor Trend “Car of the Year”; and Rochester Midland, which has developed a complete line of nontoxic cleaning products.

The good news for 2004 is that we have the chance not only to vote our convictions in the national election, but also to influence our country's environmental future by purchasing green consumer products and vehicles, and encouraging our local governments and the companies we work for to do the same. We encourage you to visit our website, [www.informinc.org](http://www.informinc.org), for new INFORM research and reports on toxic-free products, green cars, and green cleaners. And we wish all our members a very happy and green products-filled 2004!

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# Cell Phones (continued from page 1)

research shows that customer convenience is essential to high rates of cell phone recovery,” Most explains, “so permanent collections at shopping malls and other high-traffic locations would likely produce a larger and more consistent stream of used phones.” However, the existing programs have not made such drop-off sites widely available. Nor have they invested in promotion and advertising on a national level, and few provide financial incentives, such as rebates and discounts on new products, which can motivate people to donate their used phones.



## A Potential Gold Mine

Not that collecting and selling used cell phones isn't lucrative. The existing programs are generating significant revenues from the sale of refurbished phones and recyclable materials, but most of this money — over \$6.5 million raised since 1999 by the programs INFORM examined — is being donated to charity. Meanwhile, the for-profit company ReCellular, Inc., which coordinates refurbishment and recycling for the Wireless Foundation's Donate a Phone program and Verizon's HopeLine program, is generating an impressive \$25 to \$30 million in annual revenues from the sale of phones and recycled materials from all sources.

“The charitable component of today's cell phone collection programs is an important factor in getting consumers involved,” Most explains. “But as these programs amass millions of dollars from the sale of refurbished phones, it's

worth considering whether more of their income shouldn't be used for purposes directly related to managing cell phone waste.” For example, INFORM's research suggests that collection rates would improve if more resources were devoted to customer incentives, advertising, and other means of promotion.

## End of the Line

Another potentially crucial use for collection program revenues would be to ensure that refurbished cell phones are handled responsibly at *their* end of life, especially those sold abroad. A key finding of *Calling All Cell Phones* is the fact that over two-thirds of refurbished phones wind up overseas, often in developing countries where little or no infrastructure is in place to manage these products after users discard them. In addition, large numbers of used phones are exported for recycling, and recent studies have found dangerous environmental and working conditions at electronics recycling facilities in Asia.

So far, no cell phone collection program has tried to ensure that phones sold abroad are processed and ultimately disposed of in ways that protect the environment and human health. Most acknowledges that returning phones to the US for reuse and recycling, or establishing collection, reuse, and recycling systems overseas, are complicated (and expensive) propositions. Still, he says, “unless these programs take some responsibility for the reuse, recycling, and disposal of exported phones, they'll only be providing a temporary solution to the problem of cell phone waste by shifting the disposal problem to other countries.”

## Product Design Is the Key

*Calling All Cell Phones* lays out a host of recommendations for increasing cell phone collection rates, from improving existing programs through increased convenience and public awareness to

public policies such as imposing deposit refunds and banning phones from landfills.

Perhaps most effective would be a system of “extended producer responsibility” (EPR) requiring manufacturers to bear the financial and/or physical responsibility for managing their products after consumers discard them. “Many of the refurbishers and recyclers we talked to said their revenues would be even higher, and recovery rates would likely increase, if cell phones were cheaper and easier to refurbish and recycle,” says Most. “But since manufacturers bear none of the costs of refurbishment and recycling, they have little incentive to come up with designs that facilitate these processes.”

In much of Europe, recently enacted regulations encourage sustainable cell phone designs by requiring electronics manufacturers to take back and manage their discarded products and replace toxic constituents with less hazardous alternatives. Since these rules apply to all electronic products sold in Europe, they could persuade US cell phone makers to come up with designs that facilitate reuse and recycling. In addition, a new international initiative addressing end-of-life cell phones could affect the export of used phones by US collection programs.

US lawmakers are starting to look at the issue as well. Partly because of policy changes in Europe, several states now have laws governing cell phone waste, and Rhode Island's Senator Jack Reed is considering federal legislation specifically dealing with discarded cell phones. Says Most: “Awareness of the problem is growing. Hopefully, it's just a matter of time before collection programs and government policies that really drive the industry to design sustainable products are implemented on a scale commensurate with the problem they're meant to address.” ❖

## The Role of Natural Gas: A Look at the Future

Over the past 14 years, as INFORM has analyzed the options for ending our country's addiction to oil in transportation and the prospects for moving toward a pollution-free hydrogen future, our research has found natural gas to be an increasingly attractive alternative. For the US, it is the only fuel option that can achieve three goals: reducing air pollution in the near term, increasing reliance on a domestically plentiful fuel, and paving the way to the hydrogen fuel cell vehicles of tomorrow.

A global survey by the International Association of Natural Gas Vehicles recently documented that the use of natural gas vehicles (NGVs) is rising worldwide. Since 1999, the population of NGVs has grown from 1.1 million to 2.7 million vehicles. Most of this growth has occurred in South America and Asia, where seven of the ten countries with the largest numbers of NGVs are located. Argentina has been the world leader for several years, more than doubling its population of NGVs between 1999 and 2003, from 445,000 to 926,352. Brazil has shown the most dramatic growth, skyrocketing from 15,500 NGVs in 1999 to 550,000 today.

In the same period, the US increased its fleet by half, from 88,594 to 126,341. The US ranks sixth in numbers of NGVs but leads the world in natural gas refueling stations, at 1,250 — creating a significant source of untapped potential for expanding natural gas-powered fleets. But recent volatility in the US natural gas market and rising fuel prices have caused concern. For most of the past decade, productive capacity has exceeded consumer demand, keeping natural gas prices low. This has helped the emerging NGV industry establish a competitive presence in transportation markets.

In 2003, a cold winter and soaring demand for natural gas at electric power plants finally pushed demand above supply, causing spot prices to nearly double. By March, natural gas storage inventories fell to their lowest levels since 1976. In June, natural gas was selling for an average of \$5.83 per million Btus, up 169 percent from the same week in 1998.

Despite the current troubled market, the prognosis for natural gas is positive for the short term and especially for the long term, compared to petroleum-based fuels. While natural gas supplies — like those of other fossil fuels — are finite, oil is being depleted more rapidly, with demand growing in China, India, and other developing countries. As a result, the price of petroleum is likely to rise. Future prices may also be increasingly volatile, since most of the major remaining sources of oil are concentrated in politically unstable regions: the Persian Gulf, Indonesia, and Nigeria. By contrast, the price of natural gas for vehicle use is likely to remain lower once production capacity has expanded.

Natural gas provides the most promising path to hydrogen fuel cell vehicle technology for two reasons. First, refining natural gas vehicles requires improvements in the systems and materials needed to use a gas fuel — the same systems and materials involved in managing hydrogen. Second, natural gas refueling stations, once in place, can be readily converted to extract hydrogen from natural gas, thus fueling the first generation of commercial hydrogen fuel cell vehicles.

While natural gas can provide a smooth transition to the hydrogen era, it is not the ultimate solution. Even if the energy used to extract hydrogen from natural gas were renewable (which it currently is not), the gas itself is a depletable resource. A second transition will therefore be needed. Twenty to thirty years hence, renewable forms of energy, such as wind and hydropower, should be commercially available to extract hydrogen from water. For this to happen, a federal program supporting the dispersed use of renewable pollution-free solar energy technologies — a far more ambitious program than anything existing today — will have to be launched. Natural gas will then have played out its role as an effective transitional fuel.

*James S. Cannon  
Senior Transportation Fellow*

## Salaam NGVs

Nearly six years ago, the Indian Supreme Court ordered selected vehicle fleets in Delhi — one of the 10 most polluted cities in the world, according to the World Health Organization — to convert to natural gas. Since then, thanks to strong clean air initiatives in cities throughout the subcontinent, India's natural gas vehicle (NGV) program has progressed rapidly. As of late 2003, the country's population of NGVs surpassed 200,000, propelling India into fifth place, ahead of the US, where government support has flagged considerably and the NGV fleet is stuck at about 130,000 vehicles.



*A variety of vehicles compete for space on a main street in Agra, 10 miles from the Taj Mahal.*

In January, INFORM Senior Transportation Fellow Jim Cannon traveled to New Delhi to address a seminar of alternative-fuel experts on the advantages of large-scale deployment of NGVs as a first step in the transition to hydrogen. "India doesn't have the option of relying on oil as its principal transportation fuel in the century ahead," he explains. "Domestic supplies are limited and the nation's ability to import oil from abroad is constrained by fierce competition between China and US for dwindling supplies." Instead, expanded use of NGVs can reduce transportation-related pollution today while creating the infrastructure needed to produce hydrogen for the high-efficiency, zero-pollution fuel cell vehicles of the future.

India's registered vehicle population of 49.6 million includes 38.7 million motor-

cycles, 4.7 million cars, 2.5 million three-wheeled vehicles,



*A natural gas taxi in Old Delhi*

2.4 million commercial trucks, and 1.1 million buses. So far, NGV initiatives around the country have focused on converting three-wheeled auto rickshaw taxicabs, conventional four-wheel taxicabs, and municipal transit buses. There are now approximately 81,000 NGVs in Delhi alone, including more than 10,000 buses, 50,000 auto rickshaws, and 9,770 sedan taxis, all served by more than 100 fueling stations. Delhi claims to have more NGVs as a percentage of its total fleet than any other city, and its natural gas bus fleet is by far the largest in the world.

India is in a good position to increase its commitment to NGVs – and ultimately to hydrogen-fueled vehicles — because its existing petroleum infrastructure is not extensive, at least compared with the US and other developed countries, while natural gas is available domestically and imports are increasing. In addition, India has vast renewable energy resources (such as biomass), which will ultimately provide a completely pollution-free means of producing hydrogen for fuel. Until then, the fuel storage and management systems associated with natural gas are readily adaptable to handling hydrogen, and natural gas can itself be used as a feedstock for hydrogen production.

In light of the remarkable success of India's NGV program, the government is considering a new directive requiring the use of natural gas in selected fleets in 16 other heavily polluted cities. Jim Cannon closed his presentation with the recommendation that India continue its program, and publicly recognize its benefits in the long-term transition to a hydrogen economy. ❖

## Funding News

INFORM's programs would not be possible without the generous support of our foundation donors. Recent grants include:

- The Educational Foundation of America (\$75,000) for INFORM's New York City Greening Garbage Trucks initiative
- The Orchard Foundation (\$15,000) for outreach in New York and New England on green cleaning products and practices
- The Geraldine R. Dodge Foundation (\$65,000) for INFORM's efforts in New Jersey to extend "green purchasing" to the prevention of toxic threats
- The Rauch Foundation (\$5,000) for research and production of Long Island Clean Air/Clean Fuels fact sheets and educational materials for outreach to government, business, environmental, and community leaders on Long Island
- The Scherman Foundation (\$35,000 over two years) for general support and for the New York City Greening Garbage Trucks initiative

Members contributions provide the important unrestricted funds that provide a strong base for INFORM. A special thanks to all our friends and members who gave so generously to INFORM's year-end appeal!

### GIVE A GIFT OF MEMBERSHIP

The unrestricted contributions that INFORM receives from individuals support our work in creating a sustainable and healthy environment. To help us continue our work, YOU can join INFORM!

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# Green Purchasing (continued from page 1)

and incinerators. This, in turn, encourages competition among manufacturers to design such products and make them available to the public at large.

In four years, our P3 partners have grown from 2 to 16 states and municipalities in a ripple effect that suggests gathering momentum in the shift to less toxic, more reusable and recyclable products. To promote “green” purchasing at government agencies, the Purchasing for Pollution Prevention project is focusing on cost-effective replacements for products that contain persistent and bioaccumulative toxins, or PBTs — an especially dangerous group of chemicals that are toxic, that linger in the environment for long periods without breaking down, and that bioaccumulate in the tissues of animals that consume them.

## PBT-Free and More

The P3 team is providing its project partners throughout the Northeast and Midwest with information on the cost, performance, and availability of such alternatives to PBT-containing products as mercury-free medical equipment, vehicles, and building systems; lead-free traffic paint; and lindane-free lice and scabies treatments, among many others. In addition, it is recommending bid specifications and contract language that require or give preference to vendors that:

- Disclose the quantity and location of specified PBTs contained in their products. This gives purchasers a way to choose brands with the lowest quantity of the most toxic chemicals, while rewarding manufacturers that make such products available.
- Offer to take back products for reuse and recycling and ensure their proper disposal at end of life. Such “take-back” requirements indirectly give manufacturers responsibility for the products they make, providing them with an incentive to design for reuse and recycling.

## P3 Project — Notable Accomplishments, 2003

- With INFORM's help, Massachusetts becomes the first state to remove mercury-containing thermometers, manometers, and thermostats from its industrial and building supplies contracts, and to require reporting of all purchases of mercury-containing items so they can be targeted for reduction in the future.
- New Jersey begins requiring suppliers of lighting equipment to disclose the mercury content of each lamp sold on the state contract.
- The P3 team advises New York State on contract language prohibiting the use of lead-containing road paint. This will eliminate the use of *130,000 pounds of lead a year*.
- Practitioners at St. Vincent's Medical Center's Community Medicine Program (which operates 33 clinics and outreach programs for the homeless and indigent in and around New York City) stop prescribing lindane (a PBT that users rinse directly down the drain) to treat lice and scabies and switch to a less toxic alternative.
- Based on information provided by the P3 team, Erie County, New York, avoids a groundcover product containing trifluralin, a persistent chemical that is highly toxic to aquatic organisms, in favor of a trifluralin-free alternative.
- New Jersey develops a specification for its playground equipment contract prohibiting the use of lumber treated with chromated copper arsenate, which can expose children to potentially carcinogenic levels of arsenic (a PBT).
- With INFORM's help, Minnesota becomes the first state to require disclosure of mercury, lead, and vinyl components in vehicles offered on the state contract. Minnesota has committed to buying all mercury-free cars by 2004.
- Massachusetts implements INFORM's model specifications requiring disclosure of asthmagens and respiratory irritants in cleaners sold on the state's environmentally preferable cleaners contract.
- The P3 team participates in an EPA stakeholder group to develop model standards and specifications, including take-back provisions, for computer purchases by federal agencies.

## Incentives from Abroad

Meanwhile, policy shifts overseas are reinforcing these green purchasing trends and the goal of nontoxic products designed to facilitate reuse and recycling. 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 electrical and electronic products (from refrigerators, televisions, computers, and radiology equipment to toasters, cell phones, fluorescent lamps, and video games) by the end of 2006.
- 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 and lead) 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 sell in the European Union, those offering items that can be efficiently reused or recycled and that contain alternatives to the targeted toxic chemicals will have a competitive advantage. Already, INFORM's research suggests that some US manufacturers, aware of the new constraints on products marketed in Europe, are reducing their use of several PBTs targeted by RoHS and an earlier directive on vehicles. For more information on these international developments, see INFORM's fact sheets at [http://www.informinc.org/ep\\_r\\_03.php](http://www.informinc.org/ep_r_03.php). ❖

# INFORM PUBLICATIONS

📖 **Calling all Cell Phones:** Collection, Reuse, and Recycling Programs in the US  
ISBN: 0918780799 2004 85 pp. \$30

📖 **Cleaning For Health:** Products and Practices for a Safer Indoor Environment  
ISBN: 0918780799 2002 85 pp. \$30

📖 **Waste in the Wireless World:** The Challenge of Cell Phones  
ISBN: 0918780780 2002 109 pp. \$30

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## INFORMing Others

[INFORM's recent activities and findings]

### Connecticut to Central Europe and Beyond

There are few issues in which the local, the national, and the global are more intertwined than our country's dependence on oil-derived fuels for transportation. The US addiction to gasoline and diesel leads to ever-increasing levels of air pollution at home and endangers our nation's security. It is a root cause of war and instability overseas and is making the prospect of catastrophic global climate change more and more likely. This winter, INFORM addressed the problem and its most promising long-term solution — the shift to pollution-free hydrogen fuel — on all three fronts, taking our message to local communities around the country and to decision-makers on the international stage.

Building on her keynote address at the annual meeting of the Garden Club of America in May of last year, INFORM president Joanna Underwood has been speaking to local club chapters in Connecticut and New York over the past few months on ways to bring cleaner vehicles — and cleaner air — to their communities. As a result,

Garden Club chapters in Greenwich [CT] and Long Island [NY] are taking the first steps toward exploring potential clean fuels projects — confirming that sometimes the best way to address a global problem is by working locally.

INFORM has also been taking its message to more distant locales. In September, Underwood visited the shores of Lake Balaton, in Hungary, where she made INFORM's case for sustainable transportation before an audience of over 50 transportation planners and sustainability advocates from Europe, Asia, Africa, and the Americas. More recently, INFORM's Senior Energy Fellow Jim Cannon traveled to New Delhi, India, as part of a US Environmental Protection Agency program to engage Asian transportation planners on the advantages of natural gas vehicles in the transition to hydrogen (see the article on page 4 for details). Cannon then brought the global aspect of the issue back home, relaying his findings on Asia's comparatively rapid progress toward clean fuels to a group of New York City business leaders at an INFORM luncheon in February.

## Rivermead Pioneers

Lined up beside their beautiful new Toyota Prius and Honda Civic hybrid electric cars, Helen Bastedo, Patty Rotch, and John and Abby Rockett — all residents of the Rivermead Retirement Community in Peterborough, New Hampshire — show it



isn't always the young who lead this country in new directions; sometimes it's those who have seen a lot and know we must do more to protect our world who show the way. Hats off to the Rivermead Pioneers!

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# INFORMation

## EU Legislates...US Industry Responds

Research conducted by INFORM (for our upcoming report *Building Up to Danger*) offers some startling insights into the effects that policy initiatives abroad can have on US manufacturers — and on the waste and pollution they generate — in the new global economy. From 1997 to 2001 (the most recent year for which data is available), the quantity of persistent toxic chemical waste produced by US industrial facilities declined by about 2 percent. Meanwhile, waste containing some of the most hazardous chemicals declined even further: approximately 11 percent for lead, 31 percent for chromium, 67 percent for cadmium, and a full 100 percent for polybrominated biphenyls (PBBs are flame retardants used in electronics and other plastic-containing products). Waste amounts for mercury were higher in 2001 than in 1997, but declined dramatically between 1998 and 2001.

Interestingly, this trend exactly parallels the proposal and implementation of two European Union directives mandating the removal of these substances — which belong to a class of particularly hazardous chemicals known as persistent, bioaccumulative toxins, or PBTs — from products sold in Europe. The 2000 Vehicles End-of-Life Directive requires EU member states to ensure that materials and components used to manufacture vehicles are free of cadmium, chromium VI, lead, and mercury. The 2003 Reduction of Hazardous Substances (RoHS) directive bans these chemicals, as well as PBBs and other flame retardants, from electrical and electronic equipment. This may mean that US-based manufacturers wishing to market their products in Europe are making efforts to replace toxic feedstocks with more benign alternatives, and are therefore generating less waste containing the targeted chemicals.

