

Turning green with ingenuity

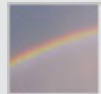
Innovation for the planet can be good business



Notions of ecological responsibility and business responsibility are more similar than most people think. Both reject waste and profligacy; both embrace the notion of responsible stewardship and investment of assets in order to reap greater returns in the long term. And while there's no question that environmental and economic agendas frequently clash, there is equal room to apply innovation to advance both agendas concurrently.

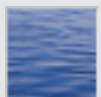
As IBM's Global Innovation Outlook project discovered, today some of the most innovative and promising ideas for reducing waste and managing natural resources come from the business community. By considering the environmental impact of their endeavors—and adopting clean technologies and environmentally sound practices—businesses can have a profound affect on the planet—not only without sacrificing revenue, but while improving it.

IBM's second Global Innovation Outlook engaged the brainpower and perspectives of a diverse group of nearly 250 thought leaders from business, academia and government, including IBM's top researchers and consultants. The [final report](#) was released earlier in 2006, and uncovered collaborative insights in three areas: the [future of the enterprise](#), transportation and mobility, and the environment and eco-efficient technologies.



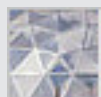
Collaborative insight

[IBM's Global Innovation Outlook](#)



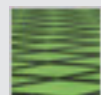
GIO 2.0

 [Read the full GIO 2.0 report](#)



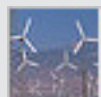
GIO podcast series

[Viewpoints on transforming business and society](#)



Environmental leadership

[IBM's commitment to the planet](#)



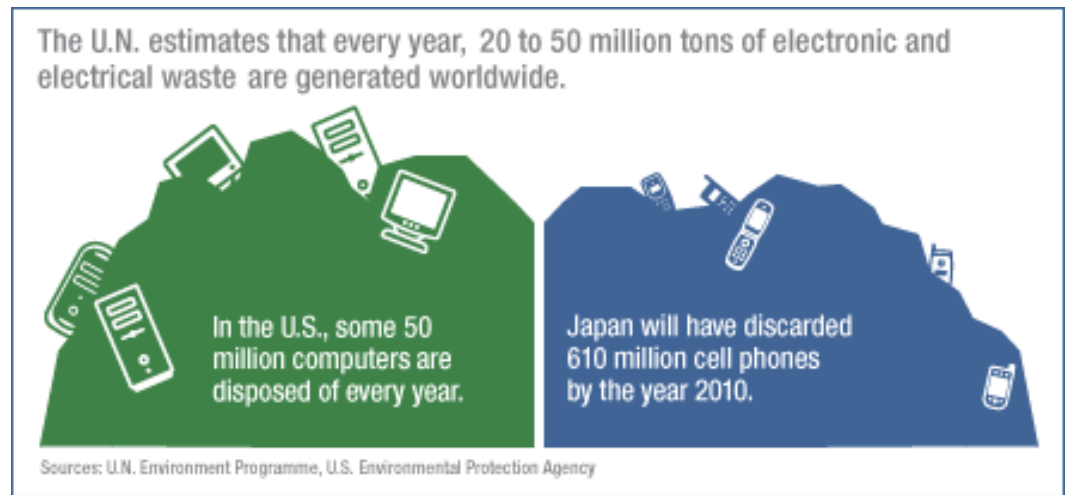
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New ways to think about waste



One of the most urgent problems facing the environment is what to do with the ever-increasing piles of discarded products accumulating worldwide—much of it electronic waste such as computer components and cell phones. This problem only stands to worsen as countries like China, India and Brazil join the global economy and billions of new middle-class consumers emerge. To stem the pile up of products, bold new ideas are needed.



Redesign product design

Traditionally, most R&D time, money and effort is directed at the front end of a product's lifecycle—its composition. But designing with the back end in sight—the product's decomposition—allows manufacturers to explore innovative new ingredients and processes they might not have otherwise considered. Already, we're beginning to see such ecofriendly products—from cell phones made of corn-based bioplastics (NTT DoCoMo and NEC) to waterless washing machines (Sanyo) to power-saving e-paper (Fuji Xerox).

Experts suggest that designing for downstream allows manufacturers to see their products in more modular ways and focus energy around parts that truly need to be updated—alleviating the wastefulness of constant new product releases. For instance, if the majority of components in a digital camera don't change from one model year to another, then why not design cameras in which the small percentage that does change can be easily popped out and replaced with new components and features? This strategy could encourage new product innovations while dispensing with the most odious aspects of planned obsolescence.

Reverse the supply chain...further

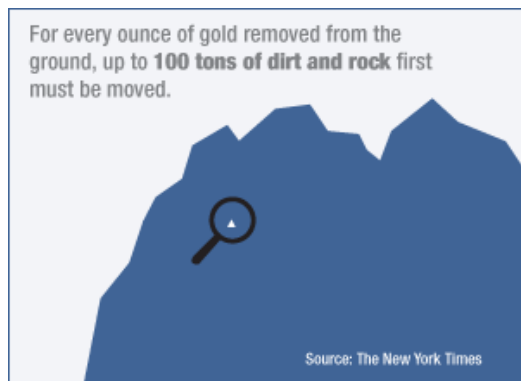
The "reverse supply chain" is a concept gaining traction today—essentially companies are finding unexpected new ways to reduce costs by reusing old parts. Nike, for example, takes the rubber soles from recycled footwear and turns them into surface materials for playgrounds and other sports facilities. Kodak and Fuji both remanufacture their "single-use" cameras after the film has been removed and developed.

But what about pushing the idea even further and yielding massive waste reduction through new collaborative relationships within and across ecosystems? Businesses could link their reverse supply chains into reverse supply networks through which they'd send used components and manufacturing by-products back and forth to one another.

Experts note that already some companies in China are exploring the concept of using treated wastewater to aid oil extraction-and suggest that water used to cool steel in the manufacturing process might, once warm, be sent to breweries to aid in the fermentation process.

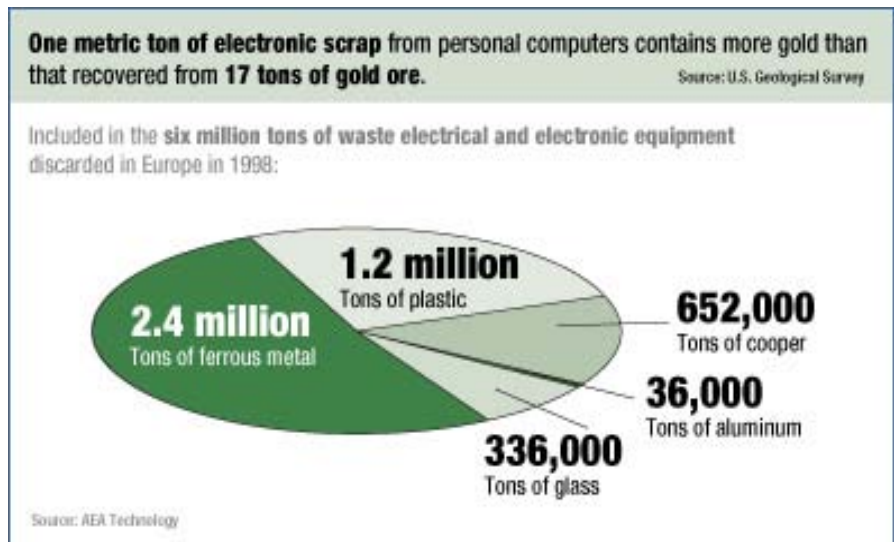
Turn landfills into gold mines

Experts estimate that the amount of aluminum in North America's landfills outweighs the amount of ore that's left in the earth. The same is probably true for copper and gold. So, what if landfills were viewed as above-ground mines?



Several experts suggest that it might not be so far-fetched to dig through the millions of tons of waste accumulating on our planet's surface. As Fernando Toledo, from Chilean mining firm Codelco, has noted: "My company used to break down mountains to get to two percent of copper. I'm sure if we were to mine the dumps, there would be more than two percent."

While there are obstacles to be sure—methane emissions from large-scale disruption of landfills being the most obvious disincentive—it may soon be possible to turn our electric and electronic castoffs into a compost of sorts.



Environmental resource planning



Strategies to address the world's energy and water shortages

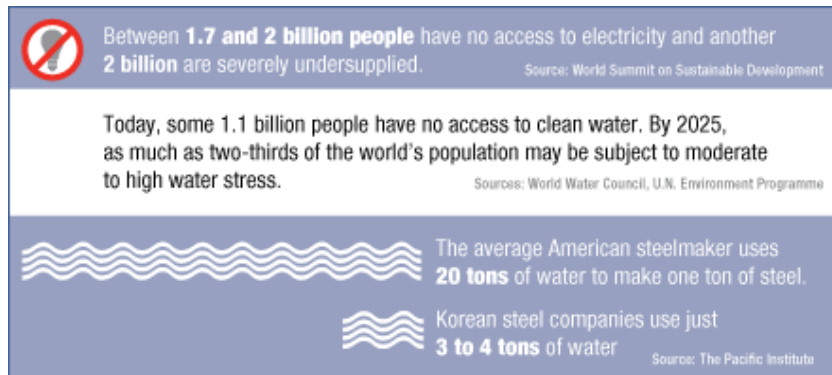
The issues around resource limitations often present themselves as intractable political positions: zero-sum games on a one-dimensional axis of interests. But by exploring the power of networks and “flipping the equations” that too often stonewall solutions, GIO 2.0 participants outlined a few, specific solutions that may point the way for resolution and collaborative action.

Mighty micropower

In the last decade, California has not built one new power plant, but during the same period it has added six gigawatts of power generation through micropower solutions—essentially, home-based or small-scale energy sources such as wind and solar. That's the amount of energy equal to the total installed nuclear power of the state.

Micropower is often considered the best energy solution for rural areas—particularly in developing countries—where no centralized power grid is available. But it's also becoming an increasingly viable supplemental source of power in developed countries because it is more reliable than outdated, overburdened grids.

In the developing world, micropower isn't just an energy source—it's a catalyst for modernization. In Indian villages, for instance, micropower enables basic infrastructure such as telecommunications and financial services. For many in the developing world, micropower is the first step toward economic stability.



Sustainable water use

The global water well is not dry just yet, but reliable supplies of fresh water are scarce in many parts of the world. To address this problem, the private sector can take the lead in designing new processes and practices for sustainable water use—particularly those companies that are aggressively pursuing new business opportunities in water-stressed nations. Operating costs are generally lower in these regions, so perhaps these companies will have greater flexibility to champion new methods of reusing water across industries or techniques to more cost-effectively filter and purify wastewater.

Corporate, personal and government responsibility



Responsibilities at all levels are increasingly personal as the spheres in which they are exercised continue to overlap and intersect. Whether acting as consumers, suppliers, citizens, officials, employees or employers, individuals have a responsibility to seek (and provide) a deeper understanding of the issues and interests affecting the environment and their role in its health. By necessity, reaching that understanding will require more open communication and more transparent agendas to enable the greatest participation and the widest positive impact.

Changing how regulators regulate

Where does ultimate responsibility lie for driving adoption of clean technologies and environmentally sound practices? With governments, manufacturers, retailers or end users?

Many cite the European Union's Waste Electrical and Electronic Equipment (WEEE) and Restriction of Hazardous Substances (RoHS) directives—which make producers legally accountable for recycling and disposal of electrical and electronic products—as Exhibit A in the case for increased regulation. Since these directives took effect, many manufacturers have begun to develop new processes and products that significantly lessen environmental impact.

Yet while some experts suggest that government regulation is driving most innovation around product composition and decomposition, others express concern that regulation may actually impede innovation. Many industry leaders believe there needs to be tighter linkage between business and government in determining those approaches that will best protect the respective interests of industry and society. If business leaders were invited to partner with policy-makers and "green" citizens groups, for instance, together they could formulate protocols that balance complementary and divergent interests in a more realistic way.

Changing how consumers consume

If people were more aware of the consequences of their actions—such as the emissions created when they flip on a light, or what becomes of the cell phone they've just discarded—they'd be more likely to make decisions that move business and society forward in a more sustainable manner, experts say.

The Swedish Interactive Institute's STATIC project has prototyped a number of everyday household objects that increase people's awareness of how energy is used in order to encourage changes in their "energy behavior." These products range from shower tiles decorated with patterns that disappear with hot-water use to an "aware" power strip that shows energy use through pulses of light.

Similarly, experts suggest that homeowners and business owners alike might appreciate integrated, real-time information that shows how quickly electricity, oil and water are being consumed—in effect, a natural resources dashboard. It could be just what's needed to get individuals and industries to cut back on usage.

Ingredient Facts

Amount Per Unit

Weight (lbs.)	% of total weight	% Recyclable
Plastics	13.8 (23.0%)	20%
Aluminum	8.5 (14.0%)	80%
Iron	12.3 (20.5%)	80%
Lead	3.8 (6.3%)	5%
Zinc	1.3 (2.2%)	60%
Tin	0.6 (1.0%)	70%
Nickel	0.5 (0.9%)	80%
Silica	15 (24.9%)	0%

INGREDIENTS: Plastics, Lead, Aluminum, Germanium, Gallium, Iron, Tin, Copper, Barium, Nickel, Zinc, Tantalum, Indium, Vanadium, Terbium, Beryllium, Gold, Europium, Titanium, Ruthenium, Cobalt, Palladium, Manganese, Silver, Antimony, Bismuth, Chromium, Cadmium, Selenium, Niobium, Yttrium, Rhodium, Platinum, Mercury, Arsenic, Silica

Read the label: informed resource consumption

What if there were a common, verifiable approach to disclosing the content of electronic devices and appliances, so that consumers could see in essence what they are buying? Might that change their purchasing decisions, in the same way that scrutinizing the fat, cholesterol or salt content of a food product causes them to select one item over another? Experts believe that just as nutritional labels have actually encouraged food manufacturers to rethink their ingredients in order to appeal to health-minded consumers, disclosing the materials content of electronic and electrical products might push equipment makers to look for new and innovative ecofriendly materials.

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