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The Demanufacturing Difference

Source: Green@Work

Two new words -- dematerialization and demanufacturing -- will become common in the office and in the home. The concept of not using as much "stuff" to manufacture (a form of dematerialization) and stripping all that "stuff," once made, into components that can be re-used in manufacture (demanufacturing) will entail a mindset much different than currently exists in our society. In the U.S. alone, we throw away approximately 500 billion tons of garbage a year.

Thinking Green

"While recycling will continue to play an important 'materials-conservation' role into the future, other options such as dematerialization and demanufacturing will grow in importance for a variety of reasons," said Lynn Scarlett, executive director of Reason Public Policy Institute, Los Angeles, Calif. "Why? Many companies have embarked on 'industrial ecology' strategies -- the deliberate incorporation of environmental values into product design and manufacturing process decisions. The drivers behind this trend are many. They include regulatory pressures and market forces and the constant search for how to reduce costs or add customer value.

"A key tool in the industrial ecology toolbox is demanufacturing -- re-examining one's core products for opportunities to create, for example, modular, upgradeable units; easy-to-disassemble products; highly 'lightweighted' products that use less and less material to accomplish a given function."

Major manufacturers of items from computer companies such as Dell to major automakers such as GM have bought into the idea.

"Canon has a cartridge take-back and demanufacturing program," Scarlett said. "Dell has a major take-back, modular design and demanufacturing endeavor for its computers. Ford is working to convert old tires into new ones. GM has a bumper fascia takeback program. HP has a laser jet toner cartridge take-back and demanufacturing program; IBM has a material-recovery and demanufacturing program. Universal Appliance Recycling reconditions used appliances; Xerox has demanufacturing programs for its copiers and toner cartridges."

The tendency of companies to "think green" and then to advertise it is noticeable on the World Wide Web. As Mercedes-Benz says, "Today, whenever possible, entire components are made from recycled floor mats, cover strips and paneling. Recycling catalytic converters, which yield such valuable raw materials as platinum and rhodium, proves that ecology can also be economical."

Scarlett defines dematerialization as the front-end production use of fewer materials per unit of output, which can be accomplished through lightweighting or servicizing" (product leasing). This is driven largely by market forces. Manufacturers use less material per unit of output. For the consumer, there also is value-added through servicizing (product leasing or taking back a product instead of the sell-dispose cycle).

"A recent EPA report on source reduction estimated that over the past decade, over 20 million tons of waste had been diverted from landfills through a whole variety of

source reduction (including dematerializing) activities," Scarlett said. "This is no "small potatoes." Work by economist Lisa Skumatz on variable rate pricing (trash fees that vary by how much the consumer places out for collection) shows that 'source reduction' (a variation of dematerialization) increases noticeably under such programs.

"Consumers respond to 'pay by the bag' trash fees by doing such things as sharing magazine and newspaper subscriptions, keeping lawn clippings on the lawn as mulch rather than sending grass to the landfill, taking used clothing to second-hand stores rather than discarding it; purchasing bulk-packaged goods which generate less waste per amount of delivered product and so on. Hence, in addition to the market incentive that many manufacturers have to search for dematerializing opportunities, at the consumer end, pay as you throw trash fees also can generate 'source reducing' activities."

Innovations Abound

On the demanufacturing end, the tools to disentangle from the chokehold of entombed garbage in Subtitle D landfills are literally bubbling to the surface. Currently, automotive shredder residue (ASR) like glass, plastic and textiles, leftover after metals are recovered, go to landfills. Since about 40 percent of ASR is plastic, a procedure called "skin flotation" is being investigated by USCAR's Vehicle Recycling Partnership, the American Plastics Council (APC) and Recovery Plastics International (RPI) of Salt Lake City, Utah.

Chemicals are added to plastics in a hot-water bath that react only with certain plastics. Air bubbles will attach to the plastic and float. They are then skimmed off of the top of the water bath. The downside? The cost, of course.

Innovation in demanufacturing includes the use of plastic for fuel to melt down electronics in a California recycling plant. Air pollution is prevented through the use of "scrubbers" on smokestacks.

"Zero-landfill" demanufacturing is not only possible, but reportably profitable with charges going to participating companies. In the area of dematerialization, companies are using nanotechnology to shrink batteries to the size of the period at the end of this sentence. The products they drive will shrink accordingly. Fewer front-end materials obviously translate to fewer in the landfill.

Regulatory Downside

Some people want to help along the processes of demanufacturing and dematerialization through regulatory means, but this has a downside.

Scarlett, in [The Green Hand of Progress](#), cites an example in California where regulations on recycled content in plastic bags deterred innovation that was creating thinner bags and, ultimately, fewer pounds of waste. Scarlett says that local and state governments are attempting to increase demanufacturing and dematerialization through what she calls "pay as you throw" programs.

"Minnesota has undertaken some pilot electronic equipment take-back programs, for example, in order to get a better understanding of costs," Scarlett notes. "Subsidies, however, pose problems. First, many companies, as noted above, have some market incentive to continue to invest in and explore opportunities for further dematerialization and demanufacturing. Under such circumstances, subsidies would be likely simply to support the less efficient, less competitive endeavors in demanufacturing."

Toward Greener SOHOs

In the strategic history of the movement to reduce landfilled waste, Scarlett said in the '80s and early '90s, attention focused on "recycling" and "end-of-the-tailpipe" methods of reducing environmental impacts. "But as we embark on the 21st century, many companies (and consumers/citizens) have come to recognize that environmental problem-solving involves a whole host of activities -- and that up-front, source reduction or pollution prevention efforts may yield better results at less cost than cleaning up pollution or waste after it's been generated," she said.

Placing those strategies into the home and office will involve the work of many professions. For example, the subject was discussed by interior designers at the NeoCon World Trade Fair this past June in Chicago, as reported by the [American Society of Interior Designers](#).

Gary Wheeler, FASID, principal, Perkins & Will in Chicago, said at NeoCon: "As society becomes increasingly networked and people shop, bank, work and correspond online, designers will have unique opportunities to lure individuals out of their caves and into the valleys for social, professional and entertainment purposes by creating more intriguing venues. Designers have the freedom and obligation to build the workplace of tomorrow."

By Neal McChristy for green@work magazine, a [GreenBiz News Affiliate](#). This piece is copyright 2001 green@work magazine, all rights reserved, and appears by permission.



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