
What Does It Mean to Be Green?

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Harvard Business Review

No. 91410

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Despite mounting pressure on businesses to prove their faithfulness to the earth, managers share no common understanding of what this might mean in their own companies. Many continue to see environmentalism against the backdrop of an adversarial public arena, as a struggle over ever-stricter emissions codes and wildly varying punishments for misconduct.

Who can blame them? In the past couple of years alone, a highly exaggerated alar pesticide scare nearly devastated apple growers in the western United States, yet Exxon reported record profits in the wake of the Valdez oil spill. An ecological misstep can mean wasted time, customer disapproval, massive cleanup costs, boycotts, fines—or nothing.

Still, managers *do* share some new and growing sophistication about what the public expects of them. In 1985, when the National Wildlife Federation's Corporate Conservation Council began to offer environmental awards to business, several corporations nominated themselves for what they obviously thought a remarkable feat—compliance with government regulations. Today a company does not expect to be considered “environmentalist” unless it is moving not only beyond the law but ahead of its industry and many of its consumers.

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Pacific Gas and Electric, for instance, recently decided that energy conservation is a more profitable investment than nuclear power. Du Pont converted its in-house pollution-prevention program into a consulting operation, and McDonald's made its well-publicized move from plastics to paper the cornerstone of a much broader, and less visible, waste-reduction strategy. The managers of these businesses, clearly, have come to believe that environmentalism has something to offer business, that it is not just the other way around.

No doubt, these managers might never have devoted so much thought to the environment were it not for brushes with environmentalists. But *having* thought about it, they have not remained fixed in the old preoccupation with regulation and punishment. Rather, they have developed an appreciation for a deeper preoccupation: *sustainable* growth. Industries (and nations, for that matter) cannot thrive if they sacrifice future quality of life for present economic gain. In the long run, the principles of economic growth and environmental quality reinforce each other.

True, these principles may clash in the short run, which brings us to the heart of any business's challenge. Sometimes managers feel they must save their businesses first—and the environment be hanged. After a junk-bond-financed takeover by Maxxam, the Pacific Lumber Company sunk into debt and doubled the rate it cut old-growth redwoods—which threatened not only the spotted owl

but also the company's future use of the land. Management might have made a sounder decision if capital had been more patient.

But in this sense, the environment around U.S. plants suffers no more than, say, the R&D within them. Environmentalism is gaining ground in the United States because it is of a piece with other movements in corporate life to invest in the resources—human and natural—that sustain a business from one generation to the next. It is part of managerial seasoning.

If environmentalism is, among other things, an appeal to lengthen corporate time horizons, how should managers use the time environmentalists would have them buy? What *should* environmentalism mean for companies? Although not everyone will ever fully agree on what it means to be green, the books and papers collected here reflect concrete and comprehensive approaches that both thoughtful businesspeople and environmentalists should be able to accept. They bring into focus three important questions that any company's environmental agenda should include.

The first, and most public, is: What products should a company bring to market? How should it package them, and what materials should it include in them? In many ways, this is the most treacherous territory—both with the press and consumers.

The second question is related to the first insofar as a company's environmental actions inevitably have to do with public perceptions: How much open disclosure of pollution and health information should companies support? It turns out that most companies do not know what ill effects they are causing, so that a policy of disclosure not only benefits them in the political realm but also disciplines the quality of their data gathering—data that can be used to solve other problems as well.

Ultimately, this discipline in husbanding information allows companies to address the third and most rewarding question in any green agenda: How can companies reduce waste at the source, how can they engage in what many now call by the uninspired term "pollution prevention"? Like the total quality movement, which has influenced it profoundly, pollution prevention builds on the practices of continuous improvement, specifically, on the examination and design of clean operating processes. Its goal: eliminate pollutants entirely in manufacturing processes rather than filter or capture them downstream.

Pollution prevention makes sense for the planet *because* it makes sense for the business. To be good to the environment, one already must know how to be very good at production.

Is the Product Worthwhile?

Joel Makower writes in *The Green Consumer Supermarket Guide* that every purchase is a vote for or against the environment. Obviously, he is right. And in the emerging political culture of America, a consumer's search for ecologically benign products can often seem as capricious as the loyalties reflected in political polls. Green consumers, certainly, do not stick to particular brands: Mobil's "Hefty" plastic bags soared in popularity when the company pronounced them biodegradable and consumers saw them as a panacea for landfills. When news emerged that the bags decompose only partially, often creating worse problems than they solve, sales dropped.

Just how many green consumers are there? Their numbers appear to be growing. Gallup surveys conclude that more than 75% of U.S. consumers include environmentalism in their shopping decisions—an impressive number, though some of this data no doubt reflects the desire of many respondents to appear responsible. In any case, it would be foolish to dismiss the recent wave of ecological concern among consumers as a passing fad. There are too many reminders around us of what many familiar products and packaging do to the environment: beach sewage, crowded landfills, smoldering piles of discarded tires, poisoned water.

Each news story prompts a natural impulse to support alternative products. If consumers accept that chlorofluorocarbons damage the ozone layer, they implicitly expect companies to search for alternatives to aerosol sprays and new technologies for refrigerator cooling systems. (More sophisticated consumers will also want action on plastics and semiconductor manufacture, but more on that later.) If consumers read that the 2.5 billion batteries Americans throw away each year leak toxic heavy metals into groundwater, won't they expect companies to develop different kinds of batteries?

Unfortunately, there is usually no technical quick fix, and the demand for one could actually hamper efforts to improve a company's environmental record. The aerosol sprays that replaced CFCs, for example, often contain butane, which not only pollutes the air but also can explode in people's faces.

Or consider the widely cited case of McDonald's packaging. Makower points out that it was not for ecological reasons that McDonald's decided to switch, in October 1990, from plastic "clamshell" hamburger boxes to paper wrappers. Quite the contrary. McDonald's had researched the matter three years before and determined that styrene packages actually were *more* recyclable than paper.

But top executives changed their minds because their customers just didn't "feel good about" styrene, as Edward H. Rensi, McDonald's U.S. company president put it. Especially disturbing was a letter-writing campaign conducted by groups of school children nationwide. That protest, of course, didn't really represent the "voting" of the general public—indeed, the year before, the company's U.S. sales had *increased*. So the company gave in not to informed, actual pressure but to anxiety about misguided, *potential* pressure.

Elementary-school protesters who demand paper today could change their minds tomorrow. They might conclude, as did chemist Martin Hocking in *Science* last winter, that styrene is environmentally less harmful, once all relevant costs are factored in: forest clear-cutting, the energy used to make paper, and the difficulties of recycling heat-preserving papers (like the paper used to wrap hamburgers). Perhaps McDonald's should have continued with its full-scale recycling program instead of converting to paper, or perhaps it should have switched to reusable dishes. The debate is still unresolved; it may take many years of experimentation to determine how best to package food.

None of this is to say that companies should throw up their hands. It is to caution managers—at least those who are serious about the environment—that they cannot let the shifting attitudes of consumers dictate their actions, even though it is consumers who are pressuring them to act. It is more responsible to judge the environmental effects of products by using scientifically rigorous methods that are now emerging.

The new journal, *Pollution Prevention Review*, showcased some of these methods in its first two issues this year. Perhaps the most promising is the complex, comparative technique known as "life-cycle costing," described by environmental consultant, Paul E. Bailey. This method of cradle-to-grave product accounting was first used for defense procurement in the mid-1960s; it has been adapted to analyze ecological problems only in the last few years.

Life-cycle costing attaches a monetary figure to every effect of a product: landfill costs, potential legal penalties, degradation in air quality, and so on. It projects likely future costs, much like cash-flow analysis does. Then it compares two or more product or packaging alternatives based on its projections.

To be sure, much of the data used in life-cycle analysis promises to leave managers feeling uncertain, especially with respect to public health. But the exercise gives a company at least some sense of the potential environmental damage or financial returns—or both—likely to result from their invest-

On Business and the Environment

The Green Consumer Supermarket Guide

by Joel Makower, with John Elkington and Julia Hailes

New York: Penguin Books, 1991 and "The Green Consumer Letter" edited by Joel Makower.

Pollution Prevention Review

edited by Jean Stephenson from Executive Enterprises Publications Company, New York.

"Responsibility and the Future"

Paper from a computer conference sponsored by Nissan and conducted by Global Business Network, July 15 to August 26, 1990. To be published by Doubleday in March 1992 as **How Great Products Get Made**.

Managing Chemical Risks: Corporate Response to SARA Title III

by Michael S. Baram, Patricia S. Dillon, and Betsy Ruffle

Medford, Massachusetts: Tufts University Center for Environmental Management, 1990.

The Valdez Principles, 1990-1991

Boston: Coalition for Environmentally Responsible Economies.

"Environmental Accounting: Beyond Compliance"

by James L. Miller

Unpublished document

Cambridge, Massachusetts, 1990.

"Use These Ideas to Cut Waste"

by K. E. Nelson

A reprint from **Hydrocarbon Processing**, March 1990, distributed by the Dow Chemical Company.

ment. For example, Bailey points to several pilot projects—whose sponsors range from a plastics industry trade association to the New Jersey Department of Environmental Protection—on the relative merits of paper or plastic shopping bags. When all environmental factors are calculated in terms of their estimated economic values—storage space, the susceptibility of the bags to vermin infestation, present and future recycling facilities—the choices may well be different for different supermarkets.

The "greenness" of a company, then, does not really start in any single demonstration of concern to produce an environmentally kind product—paper over plastic, for example. Rather, it is embodied in a company's willingness to experiment continually with the life cycles of its products. At its best, Mc-

Donald's engages in just such experimentation. It is looking behind the counter to the 80% of its waste that, according to its own figures, the customer never sees. It has initiated a pilot project in composting food scraps, it will be testing refillable coffee mugs, and it is considering introducing starch-based, thus biodegradable, cutlery.

There are other producers and manufacturers engaging in useful experiments. Many agribusinesses have become interested in alternative pest controls. As it happens, farms that use relatively few pesticides, applied only when there is evidence of insect infestation, are more productive than farms using indiscriminate aerial spraying.

In fact, the pest-control industries themselves could reexamine their products. An agricultural chemical company might, for instance, stop selling its products by the pound and instead sell consultation on integrated pest management. Even when sold at a premium price, this kind of service would be worth more to the crop grower than a warehouse full of powder.

In a similar example of corporate rethinking, last year Nissan convened an eclectic group of people, through a computer conferencing network, to brainstorm about how an environmentally responsible car company might behave. Participants included science writers, ecologists, energy experts, and anthropologists, many with long-standing reputations in the study of ecology or energy efficiency. The printouts of their "discussions" reveal how environmental talk can actually tease out—and make more acceptable—product ideas no car company would likely develop on its own. My favorite is automobiles designed to snap together into electrically powered trains for long trips, then detaching for the last part of the route. Many suggestions were futuristic, of course, and not much attention was paid to the economic justifications of any particular project.

But when product designers are forced to think deeply about the impact of their products on the planet, they cannot but consider anew what their products do and how better to deliver what they do. I suspect that the efforts underway at Volkswagen and BMW to make cars entirely recyclable will have a positive effect on the engineering of German cars—and their worldwide desirability—in the near future.

How Much Can Be Disclosed?

During the two years before the 1984 Bhopal gas leak, Union Carbide denied reports of faults in the plant. Even the local toxicologist had been given no data about the lethality of the escaping gas. An open

information policy might have spurred enough attention to prevent the leak. It almost certainly would have stimulated the community around the plant to put emergency defensive measures in place, which might have saved some lives. It also would have made the company less culpable to charges of criminal negligence.

Indeed, if any one thing can protect a company from environmental disaster, it is participation in an open flow of information about potential problems, both inside and outside major facilities. What is being done to clean up waste sites? Are the herbicides in a forestry spray toxic? If not, what could be causing an exceptionally high rate of birth defects or cancer?

When asked what is important to them, even the most litigious citizens' hazardous-waste group leaders will say that compensation is a secondary concern. Citizen's groups generally do not ask for punitive damages, not at first, but rather for health screening and independent epidemiological and toxicological studies to be conducted by people whose credibility they trust. They care much more about being protected from harm, and therefore they depend on open information.

Why have companies resisted this approach? In part, because open disclosure has cut against the grain. It has always prompted the fear that one would give away something to a competitor or give environmental groups the rope to hang you with. Not until 1986, when the Superfund Amendments and Reauthorization Act (SARA) *required* companies to report their emissions levels of 300 chemicals, have companies had any consistent way to experience the benefits of disclosure. It turns out that these are considerable.

SARA establishes no legal limits on emissions—limits are established by other laws and regulations—but all emissions (except for clear trade secrets) must be publicly reported under Title III of the act, the Emergency Planning and Community Right-to-Know provision. Reports also go into a database maintained by the Environmental Protection Agency, known as the Toxic Release Inventory. Thus any researcher or citizen could, for example, find out how much vinyl chloride the Vista Chemical Company has released from its Aberdeen, Mississippi plant since 1989; or in what year Intel stopped using arsine gas for its semiconductor-ion-implant processes in its facility in Chandler, Arizona.

Has open disclosure of this kind prompted not-in-my-backyard protest groups to act recklessly or even aggressively? Not so far. A few national groups, including Citizen Action and the National Wildlife Federation, have published lists of companies they consider egregious polluters. But local groups are just beginning to learn how to use the data. According

to the first comprehensive report on the effects of Title III, *Managing Chemical Risks*, prepared by the Center for Environmental Management at Tufts University, there may even be some inertia here: "Only a few companies had received any [follow-up] requests for chemical information from citizens," the report concludes. "Following provision of information, no additional questions or concerns have been raised."

But *within* companies, SARA has had enormous, unexpected effect. The Tufts research group studied eight companies in detail, including Dow Chemical, Intel, Occidental Chemical, Vista Chemical, and Mastic Corporation (a maker of plastic building products). They found that the mere gathering of information promoted mutual technical assistance in the company, the transfer of good practices from division to division, and increased contact with customers and suppliers. And although SARA requires no community-relations efforts, most of the companies developed outreach efforts nonetheless.

Dow Chemical's story is particularly revealing. Until 1984, Dow had never actually tallied up its pollutants. The company finally did so only under duress, when along with 85 other chemical companies, it was formally requested to report major emissions to a Congressional subcommittee chaired by environmentalist Henry Waxman. Dow's executives discovered that the company was releasing ten million pounds of dangerous chemicals into the environment. They remember that discovery vividly, because it forced them to look critically at a whole host of the company's operations: after investing heavily in scrubbers, filters, and incinerators, they were still releasing millions of pounds of chemical wastes.

Soon Dow began a concerted effort to reduce its emissions more effectively and has now cut its pollution by more than half and saved the company hundreds of thousands of dollars in the process. Moreover, Dow assigned its local plant managers the task of meeting with community leaders. Dow learned, as its environmental officer Jerry Martin put it, the public will accept reasonable progress.

SARA's success opens up the question of how other information-gathering processes can lead to voluntary efforts that make a difference. For example, one of the biggest problems with toxic chemicals is determining their *compounded* epidemiological effect. So much of the data is gathered in separate studies that are not reconciled together, and many important facts are hidden by nondisclosure clauses in corporate lawsuits.

But imagine what would happen if most companies disclosed their epidemiological data about chemical toxic effects, including anonymous data

previously suppressed, and it were compiled into a single database. It might then be possible to link chemicals and, perhaps more important, *combinations* of chemicals, to health effects. Think of the kind of research done on prescription medicines and the discoveries about how dangerously medicines tend to catalyze one another. The public and the pharmaceutical company want people to be able to ingest these chemicals with a reasonable level of confidence.

Think also of how various chemical emissions *in combination*—exposed to air, under sunlight—might amount to a health threat that is much worse than the sum of the parts, for which no particular company can be fairly held responsible and that no one company can be expected to determine. The smog in Los Angeles is the worst such case. The only way one might reasonably hope to mitigate worsening problems is through the free and open exchange of information among many different researchers. Why not work toward this end in many shared, voluntary efforts by industry and environmental groups?

One such effort already exists. The Coalition for Environmentally Responsible Economies (CERES) consists mainly of institutional investors, particularly pension fund managers, who see their underlying purpose as not just providing funds for retirement but also ensuring that people can retire in a relatively unpolluted world.

CERES's Valdez Principles (modeled loosely after the Sullivan Principles for operations in South Africa) are a package of ten affirmations to which signers—corporations and other institutions—are asked to subscribe. Signers agree to continually improve in such arenas as "sustainable use of natural resources," "reduction and disposal of waste," "wise use of energy," and "marketing of safe products and services."

The last four principles, in which signers promise four concrete actions, have been the most controversial.

- To compensate for any harm they inadvertently cause to the environment or to people; land and water are to be kept as pristine as possible.
- To make a high-level management team (including at least one board member) responsible for environmental affairs.
- To publicly disclose potential or actual environmental, health, and safety hazards.
- To conduct an annual self-appraisal of environmental progress.

The 34-page CERES self-appraisal booklet asks companies to describe their policies used to reduce pollutants, conserve energy, and protect environ-

mentally sensitive habitats. It also asks how effective those practices have been and how the public reacted. Companies also must separate policies that go beyond the law from those that simply comply.

The information on the CERES form, if analyzed comparatively, indicates a company's environmental health in the same way financial information reveals fiduciary health. The business community is beginning to encourage this trend: when the Valdez Principles were first proposed, corporate managers rejected the idea of comparative ratings. But now the managers, according to CERES cochair Joan Bavaria, are increasingly asking to be judged on a scale with other companies. Like financial data, environmental ratings could be useful for companies to show insurance brokers and lenders.

Ultimately, the usefulness of any voluntarily disclosed information—whether in a toxic-release inventory, a CERES form, or an independent survey—depends on accurate gathering and interpretation. There is justifiable concern about “phantom returns” in toxic-release statements, where companies improve their techniques of estimating or measuring emissions and then suddenly show dramatic surges or reductions in pollutants.

But reliability is bound to increase with time, so will the uses companies make of industrywide data. And the open provision of data seems to make relations between companies and environmental groups less adversarial. McDonald's deliberations about packaging, for example, included an unpaid consultation with the Environmental Defense Fund. McDonald's, in turn, was willing to share information about its practices with the nonprofit group.

Where Can Pollution Be Prevented?

Perhaps the most important finding of the Tufts report was that, merely by asking companies to provide precise information, SARA disciplined them to reduce their emissions—more so than the harshest compliance laws had. There is an analogy here to the Malcolm Baldrige National Quality Award, whose real virtue is that it forces all candidate organizations to go through the discipline of preparing an application. Companies subject themselves to searching questions about their processes that might never have occurred to them otherwise.

And as with quality, the free flow of accurate information about manufacturing processes is the precondition for creative action on the pollution front. A spike on a graph showing parts per million of copper in a plant's waste water, for example, might be early

evidence of a breakdown in the paint-spraying system.

A basic tenet of the quality movement is that the way to create a robust product is by designing quality in, designing a manufacturing process in which variations are reduced to a minimum—not by inspecting for defects at the end of the line. Similarly, the best way to prevent pollution is by designing a process in which harmful emissions have been designed out of conversion processes, not by catching effluents at the end of a pipe or smokestack.

Pollution, like a high rate of defects, is by definition the result of faulty processes. By definition, the way to eliminate pollution is to get conversion processes under control.

And though nobody can prove this yet, it seems obvious that, as with quality, designing nonpolluting processes will also, ultimately, prove cheaper than manufacturing processes that pollute. Consider what is lost in messy operations. Quite apart from the embarrassments with consumers—also the fines and legal hassles, the inspections and scrubbers, the demoralized employees and the expenses of illness—clean processes presuppose efficiencies.

In the 1970s and early 1980s, one of the fiercest recurring battles between manufacturers and environmental groups was precisely over the concept of zero emissions. A corporate environmental manager would strive to meet emissions standards set under, for example, the U.S. Clean Air or Clean Water Act. If pollution fell within acceptable limits, that was good enough; sludge or ash would then be scraped off and transported to a landfill. And if the landfills were overwhelmed, the waste might return to the incinerator or be strained through another set of filters, scrubbers, or flares. Often as not, each new layer of filters removed a smaller percentage of pollutant from the waste stream than the layer before but still meant a greater proportional expense for the company.

When groups like Greenpeace challenged the “good enough” criteria, claiming there should be no toxic emissions from any manufacturing plant, it was the most provoking thing they possibly could have said to a corporate environmental engineer. Presumably, zero emissions was as unthinkable as, well, achieving zero defects on an assembly line. How could anyone expect to achieve zero discharge? Instruments to detect escaping elements were growing ever-more sensitive, and incinerators with 99.999999% effectiveness might still release hundreds of pounds of pollutants in a year.

But the subsequent triumph of many of the manufacturing principles supporting the zero-defects movement ought to be an inspiration to managers who want to go green today. If companies can design

for manufacture and define quality by ever-more stringent standards of defect-free manufacture—if they can create quality tests at every step and eliminate inspection *because none is necessary*—why can't they strive to design processes to eliminate effluents and introduce a zero-emission program? Could such initiatives not actually prove cheaper in the long run than a polluting manufacturing process?

This view has been put forward forcefully by environmental critic James L. Miller, the former head of the Massachusetts Environmental Crime Strike Force. In a concise, unpublished document he circulated among environmentalists after resigning his post, Miller calls for "environmental accounting" in companies—a program to keep track of the expenses associated with the harmful by-products of manufacturing at every step. He says that if companies continue to face "one-pipe-at-a-time" regulation—that is, if they're forced to comply with several different regulatory programs (and several different regulators), all focused at what comes out of different pipes—they will have little incentive to take an integrated approach to reassessing the environmental implications of their production processes.

Although U.S. industry already spends more than \$70 billion on pollution control, Miller says it will face increasing uncertainty. Sophisticated measuring devices and heightened public concern have turned some regulatory standards into moving targets. Older and less competitive industries are often forced to buy expensive pollution-control equipment, which future standards could well make obsolete.

In Miller's view, the costs of maintaining processes that pollute will ultimately prove higher than the costs of working to eliminate them. At worst, the exercise of collecting data for the purpose of eliminating pollution will help unearth the costs of production and the technologies embedded in the manufacture of products. For example, Miller calls for an analysis of production processes to identify the exact types and amounts of potentially polluting materials. Miller's analysis combines principles of engineering, accounting, and strategic management to fully account for the cost of hazardous chemical purchase, storage, and handling, as well as control and treatment of air emissions and water discharges.

Like zero defects, zero discharge is not a task that can be completed quickly. It is rather a goal, never completely reachable, that sets a direction for continuous improvement. And instead of piling on costs, investments in pollution prevention would tend to be recouped not only in product quality but also in an ultimate reduction of overhead.

This message comes through in both issues of *Pollution Prevention Review*. Savings, it would seem, come from changes in attitude: people use fewer ma-

terials, they find ways to sell what was formerly wasted, and they need fewer "end-of-the-pipe" treatments. Look at 3M's "Pollution Prevention Pays" program organized back in 1975—one of the first sustained waste-reduction efforts by a leading U.S. company. At 3M, employees suggest most of the projects, and a cross-disciplinary team of employees analyzes the problems and suggests solutions. The operating division then decides how much time and investment to commit to a particular project, considering four potential payoffs: elimination of a pollutant, conservation of energy, technical accomplishment, and financial benefit.

3M claims that its programs have saved \$500 million, with an equally dramatic decrease in emissions: almost 125,000 tons fewer air pollutants, for instance. A 3M plant scaled down a wastewater treatment facility by half simply by running cooling water through its factories repeatedly instead of discharging it after a single use. Another 3M plant saved \$125,000 per year by installing new resin-spray equipment, with a more carefully controlled nozzle.

Dow's "Waste Reduction Always Pays" program, which began in 1986, has engendered more than 700 projects, saving millions of dollars a year. Westinghouse's "Achievements in Clean Technology" project, formalized in 1989, has enjoyed similar results. In one Westinghouse metal-finishing factory in Puerto Rico, the company cut dragout—the contamination accidentally carried as chemicals flow from one tank to another—by 75% simply by shaking the tank to remove solids before releasing the chemical on to the next tank.

Just as quality guru W. Edwards Deming advocates ending dependence on end-of-the-factory-line inspectors, a pollution-prevention program ends dependence on end-of-the-pipe filtration. Environmental improvement inevitably makes manufacturers look at their operations as part of a larger system: to plan, check, and act before planning another improvement. A landfill is, in effect, like a warehouse whose inventory never shrinks. A recycling operation must deal with the same transport difficulties and storage problems that challenge any distribution system, and it benefits from the same just-in-time techniques. Garbage barges and toxic trains—both of which carry unwelcome wastes long distances—are the environmental equivalents of production-distribution breakdowns.

And like the quality movement, pollution prevention depends on employee involvement. A remote manager does not see the details that need improvement. The people on the shop floor must be trained to recognize them—and managers must listen to their solutions. 3M and Dow Chemical, among others, use contests, cash awards, and incentives to reward

employees for making suggestions. Dow Chemical distributes a list, compiled by Texas-based energy engineer K.E. Nelson, of 90 employee-sponsored initiatives. Dow's awards, according to Nelson, originally went only to projects that saved the company \$200,000 or more per year. Now it rewards ideas leading to savings of \$10,000 and that show a return on investment greater than 30%.

To truly benefit a company, environmental questions—about products, information, and process—must be integrated into everyday decisions. And those decisions must reach across a wide range of management arenas: supplier relationships, manufacturing processes, cost accounting, employee involvement, design, and distribution.

In this context, the real role for the environmentalist movement is catalytic, not oppositionist. It operates, as Michael Porter suggested recently in *Scientific American*, as a creative constraint that leads companies (and, says Porter, countries) to greater competitive advantage.

The real threat to corporate environmentalism is not corporate self-interest but complacency. James Noble, a professor at Tufts University, pointed out recently that most companies find it easy to achieve about a 25% improvement just with better housekeeping measures and the adoption of relatively simple technologies. It is far more difficult to achieve the next 25%. Will companies try?

Even companies that improve their processes effectively will find themselves facing other paradoxical difficulties. For example, one of Dow Chemical's most successful new consumer products is Spiffits, a line of towelettes treated with premeasured amounts of cleanser. The March–April 1990 *Garbage Magazine*, a consumer bimonthly devoted to practical environmentalism, pointed out that Spiffits means “sending PVC and chemical-soaked plastic towelettes to a landfill just weeks after purchase.”

Now, the idea for Spiffits emerged from a focus group of working mothers. Dow's competitors are preparing similar products. Spiffits pits the needs of environmentalism against all the other things a corporation is supposed to be concerned about in turbulent times: responsiveness to customers, flexibility, creativity, competitiveness. To be green in *this* case, Dow would not only have to be better than the relevant legislation but also better than the rest of the industry and better than the desires of its consumers. Isn't this too much to expect? No. If it were, no business would ever introduce an innovative product.

Besides, environmental problems are transcendent in nature; their solution is beyond the ken of any one company or any individual industry. Global warming is the fault of everybody who burns fossil fuels. Does this mean it is nobody's? A river in which dioxin turns up might have been contaminated by pesticide runoff from farms, a chemical plant, or a municipal solid-waste-treatment plant. This does not mean that companies do not need to focus their actions on improvement.

Nor does the urgent need for improvement mean, as some environmentalist critics suggest, that market forces are ineffective at solving environmental problems. Market forces could present as much justification for an environmental revolution as a quality revolution. The problem is that, at times, the market demands actions that are too quick, and yet it exposes a company's mistakes much too slowly.

Which only means that market forces are no substitute for human judgment. The environmental movement is not at odds with corporate interests; it is at odds with the slow pace of inevitable corporate change. The challenge for environmentalists is to make their case in a language managers can understand. The challenge for managers is to listen.