Pollution

For 30 years, pollution prevention advocates have sung the praises of the concept while struggling with its reality. How has pollution prevention evolved over the years? What are the challenges and benefits it presents industry? How should advocates respond to the perception that their proposals will cut into profits? How can financial analyses be applied to pollution prevention? What other benefits flow from these programs?

The evolution of pollution prevention in the United States

Federal pollution control legislation originally envisioned a world without pollution. The 1972 Clean Water Act anticipated the elimination of pollutant discharges to navigable waters by 1985. The discharge of toxins was prohibited, and the development of technology to eliminate the discharge of all pollutants was mandated.

During the 1980s, pollution prevention came to be viewed as preferable to pollution control. For example, best available technology (BAT) was insufficient to meet all the waste component emission and discharge limits, and BAT could not prevent accidental releases. A spill could result in emissions to the air, water or soil. However, if a chemical is not used in the first place, then it can't be discharged. The 1984 Resource Conservation and Recovery Act (RCRA) spells out the need to "minimize the generation of hazardous wastes and the land disposal of hazardous waste by encouraging process substitution, materials recovery, properly conducted recycling, reuse and treatment."

Pollution prevention became explicit national policy with the 1990 passage of the Pollution Prevention Act (PPA). "The Congress finds that there are significant opportunities for industry to reduce or prevent pollution at the source through cost-effective changes in production, operation and raw materials use," the act states. "Such changes offer industry substantial savings in reduced raw material, pollution control and liability costs, as well as help protect the environment and reduce risks to worker health and safety. Source reduction is fundamentally different and more desirable than waste management and pollution control.

"The Congress hereby declares it to be the national policy of the United States that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner, whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner." (*USC Title 42 — The Public Health and Welfare, Chapter 133 — Pollution Prevention, §13101. Findings and Policy.*)

The mandate of pollution control professionals now was either to prevent pollution or to reduce, recycle, treat and release waste. Even the U.S. Environmental Protection Agency (EPA) needed time to digest the concept. EPA has issued memoranda and new regulations and has wrestled to integrate the new policy into its work.

A 1992 memorandum to all Agency personnel called for more consistent use of the term "pollution prevention," and defined it to mean, essentially, source reduction.

Since passage of the PPA, EPA's efforts, actions and internal culture constantly have returned to the need to think and to act differently. This has become the theme of the 1990s.

The need to think differently about pollution prevention has become the 1990s' theme.

Within EPA's enforcement policy are provisions for reducing fines by substituting supplemental environmental projects (SEPs). Pollution prevention projects were approved as SEPs in the EPA memos, "Policy on the Use of Supplemental Projects (SEP) in EPA Settlements" and "Interim Policy on the Inclusion of Pollution Prevention and Recycling Provisions in Enforcement Settlements."

In a June 1993 memorandum, EPA Administrator Carol Browner writes: "In the final analysis, what is critical in our efforts to advance pollution prevention is a willingness to take chances, to question established practices and experiment with new ideas, and above all, to cooperate with each other as we try to harmonize environmental protection with economic growth."

The road from control to prevention has not been smooth, however. A February 1996 EPA report, *Preventing Pollution Through Regulations: the Source Reduction Project: an Assessment,* found that the single-medium mind-set of both the regulations and of Agency staff was not conducive to the creation of flexible, cross-media integrated methods of compliance or enforcement. There was no incentive for multimedia coordination in planning and budgeting within the Agency, according to the report, and no consistency of action between offices. The statutes did not offer a framework for the implementation of broader pollution prevention approaches to compliance, and permit writers perceived the evaluation of innovation as burdensome.

A May 1996 strategic plan issued by EPA's Office of Re-

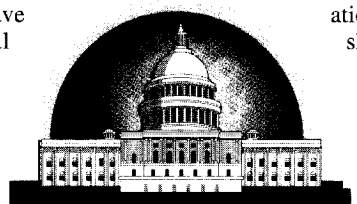
The overhead accounting designation for environmental projects creates a strong corporate bias against pollution prevention programs.

search and Development reiterated the need to press forward with pollution prevention. The combination of pollution prevention and new technologies was one of the "priorities that will receive special expanded attention," according to the plan.

In short, regulatory agencies are trying to create a carrot-and-stick compliance methodology based on source reduction. However, the legal structure and the appropriate internal Agency culture are not yet in place.

International organizations

Many business management activities have become supranational. The international community is developing its own versions of clean production or source reduction expectations. For example, the World Bank/International Monetary Fund's *Pollution Prevention and Abatement* handbook and ISO 14000/14001 procedures list prevention as the preferred method of pollution management. However, the World Bank/International Monetary Fund states that, "As evidence increasingly suggests that the old 'pollution control' paradigm is no longer adequate, the Bank's emphasis on its pollution work is increasingly shifting to environmental management," and ISO 14001 includes control of pollution in its definition of prevention of pollution. These definitions, however, are not exactly the same as source reduction.



REGULATORY IMPACT

■ **The Pollution Prevention Act of 1990**

The 1993 Ministerial Conference, "Environment for Europe," endorsed the "Environmental Action Programme for Central and Eastern Europe" as an action plan for both public and private organizations active in those regions. Included are what the document calls highly effective win-win actions. These include simple good-housekeeping measures such as improved maintenance and control, and insistence on stricter standards of plant and process management.

Paperwork has proliferated in the form of pollution release and transfer registers (PRTRs) such as the Toxic Release Inventory (TRI) Form R and the North American Pollutant Release Inventory (NAPRI).

These PRTRs are used both in the United States and abroad for many purposes other than their names might indicate. They can be accessed by anyone from citizens concerned about the impact of a manufacturing plant on their neighborhood to financial analysts trying to decide how efficient a company's processing operations are.

The challenge to industry

Waste and pollution inarguably are inefficiencies in the process, but whether they are technically or financially irreducible is a more difficult question. For example, pollution prevention may require the reformulation or redesign of products, the replacement of old housekeeping practices, the reconfiguration of manufacturing operations and even the redefinition of the relationship between vendor and customer.

By targeting the causes of pollution, industry seeks to reduce overhead and waste management costs, reduce potential health impacts on workers, reduce future health and environmental liabilities and, it is hoped, increase profits.

Perceptions of lost profitability

An October 1998 roundtable discussion involving top corporate pollution prevention professionals concluded that although it is easy to change a manufacturing process within the expense budget, it is almost impossible to do the same within a capital budget. Business decision-makers have mandates from boards of directors and investors to reduce overhead in order to increase profitability. Therefore, major changes will require the support of the chief financial officer.

The overhead accounting designation for environmental projects creates a strong bias against pollution prevention programs. Exacerbating this problem is the fact that pollution prevention programs frequently flow from environmental, health and safety departments, which are themselves usually designated as overhead cost centers.

The role of environmental, health and safety staff

Pollution prevention advocates usually have had to keep their spending within the expense budget, and then they have been able to pursue only programs that reduce operating budgets. When requests for capital funds are made, pollution prevention efforts must fit within the criteria of cost-savings projects. For example, hurdle rates frequently are a two-year payback at a discount rate of 15 percent. Even when there is a comfortable fit within the criteria, financial decision-makers frequently believe the pollution prevention project might not increase the marketability of the product and perhaps could divert resources from more lucrative product development projects.

Financial analysis and pollution prevention

The road to pollution prevention, however, still can be

Environmental Accounting

Pollution prevention strategies are particularly open to errors in estimating costs, either because the company historically has not collected the necessary data or because future costs and savings are so intangible.

The environmental costs of a product or of an action may be hidden in overhead. Environmental accounting is described using modifiers such as full, true or activity-based to indicate that conventional accounting methods do not always separate out information related to environmental costing.

sucessfully traveled by recognizing and understanding the principles of prudent financial decision-making — by clearly, concisely and completely defining the true and total costs, savings and benefits of any proposed change. The difference between existing and projected operational costs constitutes the savings or revenue stream that can be used to repay the cost of the change.

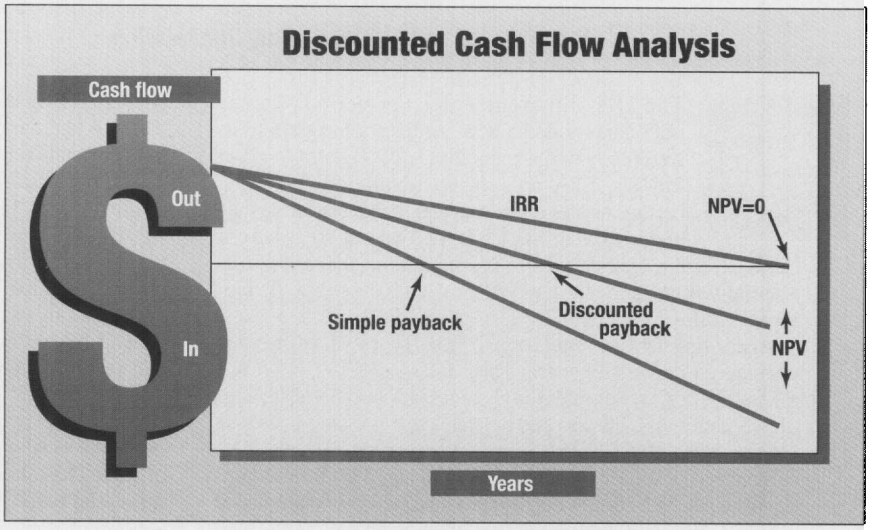
The first profitability calculation is return on investment (ROI) — the project cost divided by the annual savings in operating costs. Other profitability factors — net present value (NPV) and internal rate of return (IRR) — depend on the period of evaluation or the life of the proposed change. Most manufacturing and process equipment is assumed to a have specified useful lifespan. Lifespan also depends on the specific product marketplace and on preventive maintenance.

At the end of the period of evaluation, the NPV is the value of the cost savings after payback of investment costs. The IRR is the discount rate that produces a zero NPV at the end of the period of evaluation. IRR is represented by the slope of the line from the value of the initial costs to the end of the period of evaluation. The point where expenses equal total cost savings (where NPV=0) is the payback period. Therefore, the longer the time period in which a company can realize savings, the more valuable the proposed change. These interrelationships can be expressed graphically, as shown in the figure.

Organizations and Web Sites

There are many web sites containing pollution prevention information including:

- EPA's Enviroene web site at *www.epa.gov/envirosense.*
- P2TECH listserver and archive, used by consultants and industry professionals. The archives can be found at *www.great-lakes.net/lists.*
- The World Bank/International Monetary Fund handbook and links to international sites can be found on the New Ideas in Pollution Regulations web site at *www.worldbank.org/nipr/.*
- The National Pollution Prevention Roundtable, a national forum promoting the development, implementation and evaluation of efforts to avoid, eliminate or reduce pollution at the source, has a web site at *www.p2.org.*



The time between the initial investment and the point where total savings equals the cost of that investment is the payback period.

Avoided costs for injuries, insurance and liability are difficult, if not impossible, to measure. However, if the financial analysts will allow for these costs, it is possible to examine their 10- to 15-year histories. These cost savings usually occur more than three years into the project evaluation period. For example, a plant may close, and its site may need remediation before it can be sold, or the waste management company handling a plant's waste may not have the financial resources for closure care or remediation at the end of the disposal site's useful life. The plant may be required to contribute to the remediation costs or help pay for on-site and collateral damages that occurred over the entire life of the disposal site.

Most corporations and institutions do not allocate these costs to their source — the manufacturing or processing that created the waste. However, these costs are real and affect profitability. Investors are concerned with them when viewing Securities and Exchange Commission-mandated liability disclosures.

The allocation of all related costs to individual manufacturing or processing centers has been called Total Cost Accounting (TCA) or Activity-Based Costing (ABC). A TCA or an ABC approach takes into account unconventional, but real, expenses and calculates expenses over a longer period of time. Such changes will enhance the competitiveness of pollution prevention investments.

Pollution prevention and increased productivity

Pollution prevention begets other positive outcomes. Many productivity improvement initiatives arise from comprehensive waste reduction assessments. These assessments include data collection from previous reports, interviews and careful observation. This database is used for cross-functional brainstorming of options followed by economic analysis.

A structured process, using economic analysis tools and taking into account the ideas, suggestions and concerns of everyone involved, will advance new approaches. Costs will fall, and environmental and health benefits will appear. These productivity and quality improvements will yield a competitive advantage, as well as a more sustainable environment for the global community.

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