



The Pollution Prevention Puzzle

Which Policies Will Unlock the Profits?

by James Boyd

Is American business passing up opportunities to profit by operating clean and green? RFF case studies suggest that the answer is more complex than a simple yes or no. One thing that is clear is that corporate pollution prevention is more likely to flourish if environmental policies allow firms the flexibility to be innovative.

The concept of pollution prevention, coined “P2,” is emblematic of a new, proactive environmental mindset that promises more “sustainable” corporate management. By targeting the causes, rather than the consequences, of polluting activity, the idea is to eliminate pollutants at their sources—where and when they occur in manufacturing and other production processes—and thereby eliminate the need to treat or dispose of those pollutants later.

The concept has given rise to talk of “win-win” opportunities in which innovation and new ways of thinking will lead to waste reduction and, at the same time, make firms money by reducing costs or stimulating new products. Cast as both a corporate and an environmental benefit, the promise of pollution prevention has raised hopes that the environmental regulatory process will become less adversarial. The concept has also created optimism about the private sector’s ability to come up with low-cost solutions to its environmental problems, the premise being that prevention costs less than the cure.

Unfortunately, the vision of pollution prevention as a set of win-win opportunities is somewhat at odds with actual corporate experience. While anecdotal evidence from a number of studies suggests that such opportunities exist and that many firms have pursued them, proponents say the pace of P2 is slow and that the private sector is somehow failing to see the opportunities in front of it.

Two Theories

Why isn’t more pollution prevention observed? Consider two polar (and thus simplified) explanations. Theory 1 holds that organizational failures or barriers stand in the way of P2 initiatives. Examples include accounting methods that do not adequately quantify the financial benefits of a given P2 opportunity, inappropriate management incentive schemes, excessively high hurdle rates for capital investment, and communication problems—the so-called “green wall” that separates environment, health, and safety managers from their corporate financial counterparts. Among those who subscribe to Theory 1, the overall sentiment is that money could be made from P2 if only the corporate sector would put its house in order.

Theory 2 holds that P2 fails to occur because it is not actually in the corporate sector’s financial self-interest. This theory takes issue with the win-win perspective itself. According to this school of thought, there is nothing particularly wrong with the private sector’s accounting, communication, and financial procedures. Instead, it is simply a matter of pollution prevention offering fewer benefits than costs.

From a policy standpoint, these theories matter. The idea that pollution prevention can save firms money—but that firms nevertheless neglect P2 opportunities—calls into question the desirability of regulatory flexibility. If firms cannot be counted on to make environmental improvements that save them money

(Theory 1), isn't it reasonable to conclude that command-and-control regulations, mandated environmental accounting, and publicly reported P2 planning should be relied on to get the job done? This is tough medicine. But for the patient's own good.

For their part, corporate environmental and financial managers tend to be more skeptical of pollution prevention's profitability, citing the costliness of the technical and managerial innovations necessary to bring about P2 (Theory 2). A set of costs that is particularly apparent to this group arises from regulatory barriers that reduce the financial incentive to change production processes or introduce new products. In this view, pollution prevention's profitability—or lack thereof—depends on government policy. The prescription is for regulations that will free firms to be more innovative.

RFF Case Studies

Very little is actually known about how and why—in the real world—firms decide whether or not to pursue pollution prevention opportunities. To find out more, RFF conducted case studies of P2-related decisions made at several U.S. chemical firms, which were selected using the following criteria.

First, the pollution prevention opportunity had to be promising enough to be evaluated by a firm itself. More specifically, evaluation of the P2 opportunity had to involve not only technical but financial analysis—perhaps the most crucial component of corporate decisionmaking. After all, even if a pollution prevention technology passes muster in engineering labs or environment, health, and safety meetings, it will not succeed in a practical sense unless it survives a firm's strategic analysis and capital budgeting process.

Second, the P2 opportunity ultimately had to be rejected by managers or be unsuccessful in some other way. Unsuccessful P2 initiatives were of the greatest interest because they allowed us to focus on corporate rationales for *not* making P2 investments.

The cases that RFF studied opened a window on business decisionmaking generally and environmental decisionmaking specifically. In terms of conclusions, however, the small set of data must be drawn upon with caution. In fact, one of the main lessons to be learned is that most decisionmaking issues that arise are highly specific to the given firm and investment. With this caveat in mind, we turn to some of the

questions that the case studies addressed and tentatively answered.

Does the corporate decisionmaking process adequately capture the environmental benefits of a P2 opportunity? Being able to identify and then quantify the environmental benefits of investing in pollution prevention is a real challenge. In evaluating how successful a firm is in meeting this challenge, it is important to ask two distinct questions. First, to what extent were environmental benefits and costs *quantified*? Second, even if they were not quantified, did the firm give them an appropriate *qualitative weight* when making its decisions?

The financial analyses in the cases we studied included relatively little economic quantification of environmental benefits and costs. In general, dollar values were not attached to preventing emissions or pollution liabilities.

How is this lack of environmental accounting data to be interpreted? First, it should be pointed out that while the economic values of preventing pollution were not quantified, the technical benefits to be expected were analyzed extensively. In all of the cases, for instance, the technical merits of preventing emissions were quantified in a variety of ways. The only step that was missing was a translation of the possible technical benefits of P2 into financial ones. In fact, one of the cases revealed a managerial decision to explicitly avoid trying to quantify the environmental benefits during its financial evaluation.

Why was this step not taken? The best explanation is that it is simply too difficult to arrive at economic values with any precision when it comes to environmental benefits. When a firm is estimating conventional costs, such as that of a new piece of capital equipment, something as simple and available as the market price of the item can be used. No analogous list of prices or costs exists that can be used to assign a dollar value to reduced environmental emissions.

Given the lack of quantified environmental benefits, do the cases then suggest that corporate decisionmakers give inadequate consideration to P2 opportunities? The answer is no. Although not quantified, environmental benefits were given significant *qualitative* value and were often key drivers in the decisionmaking process. That is, they were among the top three or four motivations for undertaking a given project, as indicated in the business analyses that managers presented to their CEOs. In general, high-

level corporate decisions are rarely, if ever, made on the basis of a purely numerical analysis.

Are firms missing win-win pollution prevention opportunities? RFF conducted the case studies largely to get a better empirical understanding of corporate rationales for rejecting or delaying identifiable pollution prevention opportunities. The investment decisions that we studied appeared to have been financially reasonable, based on our analysis of them using basic concepts from business and financial theory.

The evidence contradicted the view that firms suffer from an inability to appreciate cost-saving P2 investments. Instead, it appeared that the investments themselves were financially unattractive because of significant unresolved technical difficulties, uncertain market conditions, and, in some cases, regulatory barriers or insufficient emissions enforcement. In many cases, the mystery of why a firm did not pursue a P2 opportunity could be resolved simply by taking a closer look at the costs, benefits, and risks involved.

This conclusion implies nothing about the *social* desirability of the decisions that the firms made. Reasonable persons will differ as to how much pollution prevention is the right amount. But the case studies do imply that there may be fewer low-cost, win-win P2 opportunities than many hope.

Barriers and Benchmarks

The cases challenge the belief that organizational failures are to blame for missed or delayed P2 opportunities. Nevertheless, firms do face significant informational problems when they evaluate new investment opportunities. In fact, imperfect information explains a great deal about the ways in which firms analyze and make investments. This point is best made by distinguishing between a firm's methods for dealing with imperfect information and organizational failures.

The term "organization failure" connotes the existence of a correctable management strategy, accounting procedure, or financial methodology that leads a firm to make less than optimal decisions. The firms that we studied, however, exhibited few of these correctable types of flaws. Instead, the cases depicted managers struggling with much more formidable challenges to investment decisionmaking—challenges that are pervasive and not limited to P2.

Consider, for example, what is known as the "hur-

dle rate"—that is, the rate of return that a new project must be expected to exceed before capital will be directed toward it. In general, a firm will not invest in a project whose rate of return falls short of the hurdle rate, even if the rate of return is a positive one.

This common business practice can be a source of frustration to advocates of pollution prevention, who see a positive rate of return as evidence of profitability. But a project's rate of return is meaningful only in light of its cost of capital. Moreover, the cost of capital is not typically easy to measure, since it is intimately related to project risk. Thus, the implication of a particular rate of return figure for decisionmaking requires detailed knowledge of factors contributing to risk. No single rate of return "hurdle" can be used as a benchmark for judging an investment's profitability.

Capital rationing—whereby a business unit faces a fixed, annual investment limit—was also evident in the cases. Capital rationing is commonly used to prioritize investments and discipline managers when a firm's information about possible projects is imperfect. While such rationing may mean that certain P2 opportunities are passed over, it does not follow that environmental investments are any more disadvantaged than other investment opportunities.

Policy Incentives

The best overall level of pollution prevention undertaken by the corporate sector is a question left to a different study. Analysis of the cases that we looked at, however, supports the soundness with which managers weighed the benefits, costs, and risks of the pollution prevention investments that they evaluated. Rather than organizational barriers or myopia, the cases reveal a set of complex but ultimately prosaic motivations for the decisions that the business managers made. Appreciation of those motivations is important because it can help guide public- and private-sector efforts to improve corporate America's pollution prevention performance.

First, the cases reveal regulatory barriers to pollution prevention of varying significance. The desire to experiment with different treatment, disposal, and transport options—experiments at the heart of P2 innovation—is often thwarted by rigid media- and technology-specific regulations. Given the difficulties of environmental enforcement, the rigidity of many regulations may be understandable. Nevertheless,

efforts to promote flexibility should be embraced to foster the corporate sector's ability to develop P2 innovations.

Second, some of the P2 opportunities that we studied grew out of efforts to retrofit obsolete production facilities, the costs of which are significant. It may well be that such improvement projects offer the best win-win opportunities. Firms benefit financially from the efficiencies of facility upgrades while the environment benefits from the cleaner technologies employed in more modern equipment.

Firms engaging in the total redesign of products and processes, however, are best motivated by regulations that favor inherently speculative types of innovation. Command-and-control regulations that mandate particular technologies are poorly suited for this task. Regulations that maintain meaningful performance standards but that also provide firms with technological flexibility and longer time-horizons for compliance are much more likely to lead to dramatic P2 innovations.

Third, the financial evaluation procedures that the firms used to assess P2 opportunities underscore the need for improved "green" accounting procedures, including better data collection, estimation, and evaluation techniques. But how can firms best be motivated to improve the collection and use of environmental information?

The key is a climate in which firms themselves value and demand such information. Again, regulatory flexibility is the prescription. Better information helps

firms only if they have the flexibility to act on—and benefit from—better information. Expanding the technological options open to firms increases the value of information relating to those options.

In the end, regulation that allows for a wide variety of innovative solutions is likely to be the best way to induce firms to invest in better environmental information and decisionmaking.

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To download a copy of Boyd's related report "Searching for the Profit in Pollution Prevention: Case Studies in the Evaluation of Environmental Opportunities," (RFF Discussion Paper 98-30) access http://www.rff.org/disc_papers/1998.htm. Copies may also be ordered by mail; see page 22.

Further Reading

Greer, Linda, and Christopher van Loben Sels.

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