



## Searching for the Profit in Pollution Prevention

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### Case Studies in the Corporate Evaluation of Environmental Opportunities

James Boyd • May 1998

#### Project Overview

The concept of pollution prevention, or “P2,” is emblematic of a new, proactive environmental mindset that promises more sustainable industrial management. By targeting the causes, rather than the consequences, of polluting activity, P2 seeks to eliminate pollutants at their source and thereby avoid the need to treat or dispose of those pollutants later. The P2 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. 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 too slow and that the private sector is somehow failing to see opportunities in front of it.

Very little is actually known about how and why, in the real world, firms pursue or do not pursue pollution prevention. To address this deficit, this report presents case studies of P2-related decisions made at three different firms, all global chemical manufacturers headquartered in the United States. A particular type of business activity was sought for analysis.

First, the investment or product marketing effort had to involve a pollution prevention opportunity. Pollution prevention was defined as a new product or process that allowed for pollutant source reductions or that involved in-process recycling.

Second, the investment or marketing opportunity had to be promising enough to be technically and financially evaluated by the firms themselves.

Third, the investments or product had to be in some way “unsuccessful.” That is, the firms chose to not invest in the product or process changes, or investment was significantly delayed, pending the resolution of market, technical, or regulatory uncertainties. For the purposes of this project, unsuccessful P2 opportunities are of greatest interest because they allow us to focus on the corporate rationale for *not* making P2 investments.

Fourth, the study sought projects with a capital, technical, or marketing “scale” sufficient to ensure a certain degree of complexity to the decision.

Finally, the analysis required the participating firms to provide detailed, often proprietary, data on the projects considered.

The cases open a window into business decision-making generally, and environmental decision-making specifically. They allow for a deeper understanding of the relationship between pollution prevention and corporate profitability. It should be noted, of course, that three, non-randomly selected cases cannot be used to draw broad policy or empirical

conclusions. Instead, they should be viewed as a lesson on the practical challenges facing private sector managers. Regulators, policymakers, and other corporate managers can presumably benefit from a better practical understanding of corporate P2 decision-making. The cases shed light on the following types of questions: Are firms really passing up P2 opportunities that could save them money? Do firms' current financial and accounting practices treat environmental investments differently from other investments? What hurdles must P2 investments clear? Do firms evaluate P2 opportunities in a defensible manner, or are there persistent organizational biases against P2, perhaps due to inappropriate accounting procedures or incentive schemes? Are there unambiguous financial benchmarks that can be used as a guide to which P2 projects should go forward?

The cases reveal the kinds of technical, regulatory, and informational issues that are likely to face any firm contemplating P2 innovations. While based on a very limited sample, the evidence contradicts the view that firms suffer from an inability to appreciate profitable P2 investments. Using concepts from business and financial theory to analyze the decisions that were made, the study concludes that the investments 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 P2 opportunity was not successful can be resolved simply by taking a closer look at the costs, benefits, and risks involved.

### **Principles Illustrated By The Cases**

The cases concretely illustrate a set of more general principles relating to the technical, regulatory, and financial challenges facing P2 project evaluation and implementation.

#### *Technical Issues*

P2 projects will often present complex technical challenges that have important implications for financial analysis.

*In complex manufacturing operations, even a relatively small pollution prevention process change may require changes in a whole set of interrelated processes. If so, the pollution prevention option cannot be analyzed financially without a technical, financial, and regulatory analysis of these other required process changes.*

Moreover, firms must often bear costs in order to estimate the costs of potential new projects.

*Formal financial analysis may in some cases be moot, if technical uncertainties associated with the project cannot themselves be resolved at reasonable cost.*

Before financial analysis can occur, the firm must be able to identify the new technologies and processes that will be required by the project. In order to come to that specification, however, numerous questions must be answered.

### ***The Implications of Uncertainty***

Uncertainties, whether market-related, technical or regulatory, can fundamentally alter the economics of a project decision. For instance, uncertainty can in some cases create an incentive to delay action.

*With some investments, there is value in the delay of a project decision. Delay allows for resolution of uncertainties and the avoidance of irreversible, and potentially wasted, investments.*

In economic parlance, there may be a significant “option value” to delayed investment arising from unresolved uncertainties.

### ***Regulatory Pressure and Regulatory Barriers***

Effective regulatory enforcement may be important to the development and marketing of P2 products. Meaningful monitoring and compliance efforts, particularly those directed at under-regulated firms, increase the financial value of new products that provide P2 solutions.

*Existing effluent standards can act as a powerful motivator for pollution prevention by creating markets for technologies that can address firms' compliance issues.*

While effective regulatory enforcement is in some cases central to the creation of markets for P2, some forms of regulation can stand in the way of P2.

*In some cases, regulatory rules can raise the costs of supplying and using pollution prevention technologies. This can have the unintended consequence of inhibiting the diffusion of technologies with desirable environmental characteristics.*

The desire to experiment with P2 innovation is often thwarted by rigid media- and technology-specific regulations.

### ***The (Unsuccessful) Search for Clear Financial Benchmarks of P2 Profitability***

Financial analysis of any investment is as much an art as it is a science. The complexity of factors employed in a sound investment analysis and incomplete information regarding future market, regulatory, and technical conditions mean that calculations of financial return need to be viewed with caution and sophistication. For instance,

*Accounting techniques must be evaluated in order to determine whether reported benchmark figures (such as rate of return) are viewed by management insiders as complete and unbiased. Managers are likely to better understand the ways in which their own analyses are biased. If so, benchmark figures must be interpreted with care, particularly by outside analysts.*

While the “rate of return” to P2 projects seems a natural metric of desirability, even that measure must be weighed against a larger set of factors.

*Rate of return is relevant only as it compares to a project's 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 decision-making 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.

### **Conclusions and Implications For Public Policy**

Rather than organizational barriers or myopia, the cases reveal a set of complex but ultimately rational motivations for the decisions made by managers. Appreciation of those motivations is important because it can help guide public- and private-sector efforts to improve corporate America's pollution prevention performance.

This analysis' conclusions should not be taken as either a defense or condemnation of the firms' environmental performance. The “right” level of pollution prevention to be undertaken by the corporate sector is a question left to a different study (though it is worth emphasizing that regulations, and the avoidance of regulatory costs, were in all the cases a “driver” that motivated the firms' search for pollution prevention). Still, without a detailed accounting of social benefits and costs, little can be said about whether more or less stringent regulation was appropriate in these cases. Instead, the cases say much more about *the way* in which firms are regulated.

The report advocates more extensive experimentation with flexible, “performance-based” regulations. P2 increasingly calls for firms to engage in the redesign of complex products and processes in ever-changing product markets. Performance-based regulations, which allow greater latitude for technological experimentation via product and process reconfiguration, will enhance the expected financial value of truly innovative approaches to pollution prevention.

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*James Boyd's report, Searching for the Profit in Pollution Prevention, can be downloaded (as a PDF file) on the internet at --  
[http://www.rff.org/disc\\_papers/PDF\\_files/9830\\_may.pdf](http://www.rff.org/disc_papers/PDF_files/9830_may.pdf).*

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