

Implementing the Pollution Prevention Act of 1990

Leading Every Firm to Stewardship

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Abstract

The Pollution Prevention Act of 1990 establishes source reduction as the preferred method of pollution control and empowers the U.S. Environmental Protection Agency (EPA) to develop and implement a strategy to promote source reduction. Unlike other statutes that rely primarily on regulatory mandates, this statute, while recognizing the importance of the regulatory programs to promote pollution prevention, relies primarily on facilitation, coordination, and training to encourage voluntary adoption of these measures by businesses. Hence, to be successful, States and EPA need to identify how to best motivate firms to take responsibility for improving environmental quality and achieving sustainable results through source reduction.

This paper disaggregates firms into three groups -- early adopters, mainstream, and laggards -- and explores the different motivations that affect their adoption of source reduction techniques. It then presents a process map that explores the variety of state and federal program elements that need to be adopted and the appropriate timeframe for their implementation to comprehensively encourage all members of the business community to consider pollution prevention.

Introduction

The Pollution Prevention Act of 1990 establishes source reduction as the preferred means of addressing pollution problems in the United States. Individual media programs (air water, solid waste, etc.) are to give preference in their regulatory efforts, to approaches that rely on pollution prevention. The Act also directs the Administrator of the EPA, among other requirements, to facilitate the adoption of source reduction techniques by businesses by fostering the exchange and dissemination of information, to make State grants to promote these techniques, and to coordinate source reduction activities in media EPA offices.

In a perfect, economically efficient, world there would be no need for such a program because the economic benefits of implementing the Pollution Prevention (P2) option would immediately make it the strategy of choice. All the states or EPA would need to do is to assure the existence of a pollution prevention based approach, and every generator of pollution would quickly adopt this most cost effective approach. Experience has shown that the existing world is far from economically efficient. Although P2 strategies now exist for most pollution problems businesses face, there remain numerous obstacles impeding their adoption. These impediments include: inertia or unwillingness to change from what is tried and true because of customer concerns, lack of internal technical expertise, product specifications, quality concerns and a myriad of other internal obstacles that can be identified as “risks of change”; competition for and availability of

capital within the firm; lack of information on the availability and state of development of P2 options; and occasionally regulatory obstacles.

Hence, developing a P2 solution for a pollution problem is just the beginning of the process. The role of state and federal P2 organizations needs to be one of addressing these inefficiencies in the economic system to accelerate the diffusion of the technology in the marketplace. Since the strategies must succeed on their own in the competitive economic environment, State and EPA programs need to focus on eliminating these barriers to adoption, in particular the “risk of change.” Also EPA and the States have a role in nurturing and developing nascent P2 strategies to assure they get a fair chance at competing in the marketplace, and then working within the market and regulatory structure to accelerate the process of diffusion of P2 technology. Table 1 presents a process flow map consistent with this approach.

Role of EPA in Developing P2 Solutions

It is not the place of primarily regulatory agencies to develop compliance strategies for firms. Companies and vendors necessarily must take the initiative in identifying the most competitive strategies for compliance for their individual circumstances. However that does not mean EPA and States should be indifferent to options pursued. The Pollution Prevention Act of 1990 established a policy that requires the agency to promote the adoption of source reduction approaches.

In some cases EPA can play a direct role in the development of P2 options. In limited cases it can directly sponsor research and development of promising control options through such programs as Design for the Environment. Another promising role is in providing a forum for companies to come together to develop partnerships. For example, EPA has advocated for Greening the Supply Network (GSN), Hospitals for a Healthy Environment (H2E) and other voluntary initiatives such as Green Building LEEDS certification and green hotel programs. This has led to individual programs at many facilities through greater awareness of options and the availability of and access to accurate information. It also has led to the standardization and branding of programs, which has eased their adoption and increased their acceptance and recognition. The initial involvement of EPA and State agencies has given much needed credibility to partnership programs and acted as an essential catalyst to their acceptance by the business community.

EPA and States can do a lot to encourage the development and the nurturing of P2 options. While vendors must do most the heavy lifting in developing P2 options, EPA has a role in ensuring the market recognizes the technology. Most importantly, EPA and States can disseminate information on newly developed P2 options, act as a reliable source of objective information on costs and benefits and identify case studies where the technology has been applied. In a similar role, EPA can verify a vendor’s claims for a technology’s performance through programs such as EPA’s Environmental Technology Verification program, which

develops impartial analyses of performance claims made by vendors of new source reduction technologies. While regulatory agencies seldom endorse technologies (Energy Star being a very effective exception to this), EPA can make sure it provides for this technology in its rules, leveling the playing field for the P2 option as it competes against more established control techniques. It is important that EPA not mandate any approach, but it is equally important that it work to overcome artificial barriers to the adoption of new technological approaches.

Strategies for Accelerating the Adoption of P2 Strategies

Once a P2 strategy exists, which is presently the situation in many instances, it becomes the role of EPA and States to accelerate the diffusion of the technology throughout the industry. The key to achieving rapid adoption of new technology through an industry is to recognize that not all firms react the same to change. There is a general flow in the adoption of new technology from early adopters, through to the mainstream and finally to laggards. Each of these groups has clearly identifiable characteristics and is best motivated by different interactions with governmental agencies. While this is a simplification, since many mainstream firms share characteristics with early adopters while others share many with laggards, it is a useful way to assess the range of characteristics and motivations and provide a framework for developing a strategy for each group.

Early Adopters are generally motivated by either a strong interest to advance environmental protection as a corporate policy or by a desire to maintain a technological edge and hence a competitive advantage over their competitors. Although their motivations for pursuing pollution prevention are very different, they nevertheless share many important attributes that influence their decision to implement Pollution Prevention strategies sooner than most others.

An environmentally motivated firm has recognized the importance of Corporate Social Responsibility in the design and use of its products and the importance of source reduction, not only as part of its environmental responsibility to reduce its environmental footprint but also as a means of remaining competitive. They recognize that this corporate culture positively impacts employee health and safety, helps them attract and keep good employees, and helps create a positive image of their product in the minds of their customers. In many cases, these firms are using their environmental ethic to distinguish their products from their competitors' products.

Firms seeking technological advantage are often firms who are used to moving quickly to fully attain the economic benefits of innovation and of being first to market. Often their industry is growth oriented and changing quickly. They recognize that environmental controversy leads to delay and that the costs of delay are significant. They recognize that being on the forefront of environmental activity is a business necessity if they hope to continue changing as rapidly as they want. They are better than their competitors at recognizing these less easily quantified benefits in making their capital investment decisions.

Whether motivated by environmental consciousness or a desire for technological superiority, both these types of firms have generally already internalized and understand the direct and indirect advantages of source reduction over abatement oriented control strategies and often have been in the forefront in their development. Early adopters usually have strong internal technical capability. This not only allows them to better manage their suppliers but also helps them partner more effectively with them in reducing waste and inefficiency. Their environmental managers have responsibility for advocating the firm's environmental policies both internally and externally and looking "beyond the horizon" for future issues and solutions before they become regulatory issues. They often have a functioning Environmental Management System, usually ISO 14001 certified, integrated into their planning process. They recognize that innovation requires change, and that change provides not only risk but, if done right, the opportunity for disproportionate reward, especially for those who move first.

Because of either their corporate culture or the demands of their industry, they value the ability to move quickly and autonomously and are willing to plan and invest to be able to do so. In many cases they want flexible permits to give them this ability to move quickly. They also want to be "held harmless" or have the patience and understanding of the regulatory agency and the ability to go directly to senior agency management when the strategy they pursue does not perform as expected. Early adopters want to be involved with policymakers to learn of developing issues in their earliest stages. Hence they seek to be recognized as leaders and seek to interact in rule development and other environmental policy forums. These firms are the sources of the case studies used later to encourage and educate others. They respond well to State/EPA Stewardship and Leadership programs that recognize their accomplishments and provide them access to policymakers. It is not unusual for early adopters to be driven by key personalities within the firm.

Mainstream firms encompass the majority of firms in an industry. These firms are more sensitive to the risk of change than early adopters. These firms express the risk of change in a variety of ways such as concern with customer acceptance, need to meet customer production specifications, lack of time to respond to regulatory requirements, and generally overestimate the costs and underestimate the benefits involved in making a change. They will usually not act until they feel they have no choice either for regulatory or competitive reasons, and even then they will resist technology that is not "proven". They are more comfortable being reactive than proactive.

Mainstream firms generally believe that they run very efficient operations (whether it is true or not) and don't fully recognize the competitive advantages of P2 strategies. The level of internal technical competence varies, but they are often dependent on vendors and trade associations to keep them abreast of changes in technology and regulatory requirements. They don't want to be either the first or the last firm to adopt new technology. Hence they resist new technology until

they conclude that the technology has become “mainstream,” generally after 20-30% of their contemporaries have adopted it.

They consider themselves good environmental citizens because, in their minds, being a good citizen does not extend beyond compliance with the constraints of environmental laws and regulations in a timely manner. If they have an Environmental Management System (EMS), it was likely adopted because of external requirements, such as customer demands for ISO 14001 certification, rather than the desire to increase environmental responsibility. It is usually a stand-alone document assigned to the environmental manager of the firm to maintain. EMS efforts sometime lead to consideration of P2 measures, but often the only measures adopted are just the low risk, low capital measures with short payback periods. When shown a P2 strategy that is a cost effective alternative to their existing process, they usually regard it as an aberration (e.g., who was the idiot that decided to do it the way we’ve been doing it?) rather than a systematic way to reduce costs. Even when a P2 measure is successfully implemented, the environmental benefits will be secondary, if articulated at all, compared to the cost savings. The environmental manager’s role is to keep permits up to date, be aware of regulatory compliance dates and maintain all regulatory recordkeeping and reporting requirements. He seldom has a voice in production decisions or even communicates regularly with those who make production and design decisions.

The introduction of new technology in a mainstream firm usually requires an action-forcing event. New regulations often serve as the catalyst for change. However, expansion (with the need to acquire a new permit), changes needed to meet a customer’s new requirements, or a failed regulatory inspection can be other common reasons for exploring P2 options. Stakeholder action, particularly if it results in bad publicity, can sometimes spur action as well. Once a mainstream firm becomes open to change, it then needs to be convinced that the risk of change is sufficiently small as to be manageable. The targeted decision maker is not the environmental manager but either the owner or plant manager. While the environmental manager will be relied upon to screen and evaluate options, he seldom will have the authority to decide. Hence efforts need to focus on providing information and case studies in a variety of channels so that when the “teachable moment” comes, the information is available to the technical staff, the company’s management and those on whom the company’s management relies for advice.

The technical staff will get its information from attending education programs sponsored by vendors and trade associations, reading outreach materials provided by independent technical assistance providers such as university based Manufacturing Extension Programs (MEP’s) and government sponsored technical assistance programs, reading industry journal publications, and collecting information on readily available and dedicated web sites. Other ways to raise the awareness of technical staff regarding the availability of source reduction options include having permit engineers and compliance inspectors provide P2 information when conducting inspections

and through efforts, such as Performance Track, to encourage the development of Environmental Management Systems.

Trade association sponsored meetings, articles in the trade press, and vendor sponsored outreach efforts are often the better way to reach the decision makers of mainstream firms who may trust their own industry experts more than government. Keeping decision makers current with the state of the art through publication of case studies in trade journals and sponsored forums involving their peers who have adopted P2 measures are the most effective ways of eroding fear of doing something new.

Another useful approach in overcoming the risk of change is to provide a small subsidy in the form of a demonstration grant or tax credit for installing P2 measures. Additionally, if enforcement action is taken, a Supplemental Environmental Project (SEP) to mitigate penalties can also encourage source reduction. It is important to recognize that a demonstration grant, tax credit or SEP provides the decision maker an implied regulatory agency endorsement of the chosen technology. While the financial considerations may “close the deal” in some cases, government endorsement through a demonstration grant, tax credit or SEP is often more compelling than the economic value of the financial incentive because the regulatory entity is perceived as having a stake in the decision.

Laggards exist because, just as someone has to be first to adopt a new technology, someone also has to be last. These firms usually have no appreciation or understanding of the environmental problem they are causing or contributing to, nor do they feel particularly compelled to address it. They regard environmental regulation as an unnecessary burden imposed by the government on their ability to make a living. They are often very inefficient and remain in business because they serve a particular niche of customers or because production is a relatively small part of their costs. Disproportionately, laggards are small businesses. They have limited internal technical capability and depend heavily on vendors for technical advice and often for services, like environmental recordkeeping and reporting. Generally production isn't central to sales and only gets any attention when something goes wrong. The owner or plant manager is a strong proponent of the philosophy “if it isn't broken, don't fix it” as well as “we've been doing it this way for [many] years.” Margins are usually thin (often because of higher than average production costs) and little investment capital is available.

These firms resist change until a calamity occurs such as a major accident or a substantive violation of a permit or regulatory requirement. For these firms, strong regulatory enforcement action is the most effective motivator especially when coupled with technical or small business assistance. Incentives such as tax credits or low interest Small Business Administration (SBA) loans can be useful tools. However, more often than not these firms will pursue options that require the least amount of capital and least amount of change to their way of doing things regardless of evidence that P2 alternatives are more cost effective. They often justify their

decisions based on their insistence that customers require them to do so or that they are unique in their industry. Most often these firms change when the owner sells or transfers his assets to a different management team (often younger family members), or after bankruptcy proceedings require them to reorganize and address their regulatory problems.

Strategy for Advancing Pollution Prevention

Given the disparate characteristics of these three groups, how should environmental agencies target them? Table 1 presents an approach for accelerating the adoption of pollution prevention measures. It seems obvious that the pollution prevention program needs to coordinate with the media oriented regulatory programs to identify and define the problems that need to be addressed and to coordinate actions. It is the media program that manages the permit programs, rule development and often the enforcement program. They have access to many of the levers that get the attention of firms and can be of great assistance if they are “on board”. Regulatory programs are primarily interested in finding the quickest way to solve the environmental problem. While sensitive to cost effectiveness issues, they usually are ambivalent to whether the emitter chooses to pursue a P2 or an abatement oriented approach and initially may even be hostile to the source reduction approach if the P2 solution delays emission reductions or slows the regulatory effort. The P2 program needs to bring its fresh eyes to the problem, work with them in identifying P2 solutions to the problem, help them understand why the P2 solution is a better option than abatement, and work with them to assure the regulatory effort doesn’t solely focus on abatement based strategies. The P2 programs are also often better suited than the regulatory offices in developing partnership based approaches specifically because they are non regulatory.

Once a set of P2 alternatives to address an environmental problem exist, the P2 agency needs to focus on the early adopters to encourage them to adopt the measures through Leadership programs, and other early outreach efforts. It is also important to assure that both the early adopters and the regulatory programs are receptive to the approaches being developed. It may be necessary at this point to fine-tune the options based on the suggestions and concerns of both the early adopters as well as the regulatory agency. After all, these firms are on the cutting edge. Without the acceptance by a significant number of the early adopters, there is little hope that the source reduction option will become a mainstream solution. If they are unwilling or unable to implement the measures, it suggests that there is a problem with the approach. Similarly if the regulatory program has problems with the approach, most firms will not even want to consider adopting it. Developing success stories among early adopters is key in getting mainstream firms to later consider the pollution prevention based approach.

The next targets are those in the mainstream who have the most to gain and/or are the most progressive in the group. Vendors and trade associations are useful sources of information in identifying these firms and as a conduit for information and technical support to these firms. Bringing in regulatory agency “experts” to work with vendors and trade associations to present

information at workshops, trade association meetings and technical seminars sponsored by vendors can be a valuable way of delivering targeted information to the corporate decision maker. In addition, many Leadership programs include a mentoring component, which can be a valuable source of credible information. Small demonstration grants, tax credits, technical support and, where appropriate, source specific compliance schedules that provide for the testing of the technology are all tools to help the first of the mainstream adopt P2 measures. EMS assistance is also an effective means of getting consideration of these measures. The approach should be to use any available incentives such as demonstration grants and tax credits to convince 20-30% of the firms to change to the source reduction alternative. Something near this level of penetration should be considered the “tipping point” where the technology is considered sufficiently developed to be mainstream. If the economic or product improvement benefits are great enough, lower levels of market penetration can be sufficient.

Once the targeted penetration level has been reached, if an upcoming regulatory mandate exists, the P2 program should shift from nurturing the technology to emphasizing the regulatory requirement. The mainstream firms that are more receptive to change will recognize the economic benefits first and take advantage of them before the tipping point is reached. The remainder will need a more regulatory oriented push to get them to act. The P2 program should place less emphasis on providing incentives, such as demonstration grants, and more emphasis on assistance meeting the upcoming due dates for compliance. The P2 program should begin coordinating with compliance assistance outreach and participating with them in promoting compliance with the upcoming deadlines. Technical assistance can also be offered as a follow up to inspections that identify firms that will have an upcoming compliance date and promotional materials should place greater emphasis on the requirements for compliance with upcoming regulations than on the economic benefits of pollution prevention. At this point, the goal becomes to assure that all implementation concerns and issues are fully addressed and that the targeted firms have all the necessary information to decide whether to use the source reduction approach to comply in a timely manner.

Once the compliance date passes, the primary opportunities to advocate for the adoption of source reduction approaches will come from assisting firms facing future permitting requirements and assisting the laggards quickly come into compliance in response to enforcement actions. Applications for new permits, renewals of permits and permit modifications that require the consideration or adoption of best practices should be updated to assure that the P2 solution is adequately considered in all future permit applications. Inspectors can provide the laggards technical assistance materials or contact information for the P2 program. However, in many of these cases, the firms will be more concerned with what can be done quickly, easily and with the least amount of capital investment than in evaluating what is most cost effective in the long term. They often are seeking packaged solutions and vendors who can quickly and reliably provide them. Another issue that sometimes arises involves the additional time that may be necessary to modify operations to implement a P2 strategy when compared to simply installing

an abatement device. Informing enforcement personnel of what is considered a reasonable time frame for implementing the source reduction strategy can be helpful.

Where no regulatory mandate exists, the P2 strategy needs to be advanced as the mainstream, most cost-effective, state of the art approach to performing the operation. The P2 program should be looking to influence the next action-forcing event the firm faces. Technical assistance and promotional materials will need to continue to stress the direct and indirect economic benefits as much as the environmental, and worker health and safety benefits. Publication of new case studies in the trade press should emphasize new applications and improvements to the technology that make the P2 strategy even more cost effective are helpful ways of demonstrating that the technology is mainstream and becoming increasingly commonplace. As with the case where regulations exist, permitting requirements need to be updated to require the consideration of the P2 approaches for new or modified operations. Manufacturers can be encouraged to modify their specifications to require their suppliers to adopt these approaches. Generally these firms respond to an external push. It is not enough to answer the technical question of “How do I best do this?” It is also important to tell him why he should do it and why he needs to do it now.

As can be seen, there is a progression that a source reduction strategy follows through an industry. Concerted, coordinated efforts with the media programs that change the emphasis of the program depending on the level of adoption of a technology would provide the most effective use of resources and be most consistent with the goal of the Pollution Prevention Act of 1990 to make source reduction the preferred method of compliance with environmental rules and regulations.

Measuring Success

The most direct measure of success of a source reduction strategy is the change in the environmental efficiency of the industry. Pollution generated per unit of production or per dollar of sales should be reduced if a P2 strategy works as expected. Where the economics of an industry do not change, risk reduced or quantity of pollutants reduced can serve as a reasonable surrogate. Appropriate indexes based on eco-efficiency have been developed (see, for instance, “Use of Indexing to Enhance Strategic Pollution Prevention Targeting,” by John Calcagni, Dan Ahern, et al., presented at the 2003 National Pollution Prevention Roundtable, in Louisville, KY) but the data available for specific industry categories will determine the degree of refinement necessary for effective measurement.

Publicly available sources of information on pollution generated by an industry include TRI reports and state permits. Information on quantities or value of product shipped by sectors is usually available from trade associations, trade publications or from government reports. However, most of the government reports will not publish individual company information, and the composition of their sectors may not match the targeted industries. Also, this data is not usually available in “real time”, often lagging the action by a couple of years. Hence

government data can best be used to confirm trends, while more recent industry, trade association or trade press data is more useful for measuring progress in the short term. In addition, anecdotal data collected from annual reports, corporate accountability reports, and EMS evaluations can be useful for setting benchmarks and goals and establishing norms for an industry and for working with individual firms.

Conclusion

All of the techniques and tools discussed have been already tested and shown to be effective in assisting members of the business community become stewards of the environment. Most States and EPA have implemented programs applying many of these tools to address specific situations. However, none have methodically adopted comprehensive measures in an integrated fashion, recognizing the need to address the different motivations of the three groups and the point in the adoption cycle to which each of the groups respond best. The areas that need the most attention from P2 agencies are working with the media-specific regulatory programs, coordinating efforts to address priority sectors, and improving benchmarks and measures of progress to make them more meaningful and easier to use.

Table 1

Process Flow Map for Accelerating Adoption of Source Reduction Strategies



