

**SMALL BUSINESS BRIEF**

**PERCEPTIONS OF AND RESPONSES TO ENVIRONMENTAL  
ECONOMIC INCENTIVE PROGRAMS: AN INDUSTRY COMPARISON  
FOR SMALL AND MEDIUM-SIZED COMPANIES**

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**ABSTRACT**

*State and federal regulators have turned to economic incentives, such as toxic use fees, as a means of encouraging pollution prevention. This paper examines how regulatory policies can influence environmental policy of small to medium sized firms in two particular industries. Environmental managers were surveyed in order to describe responses to and perceptions of the various types of regulatory policies that can be used to help eliminate or control toxic emissions. Not surprisingly, firms are most concerned with compliance with traditional command and control regulations. However, these businesses also indicated that some economic incentive programs would provide motivation to reduce toxic emissions. Implications for small and medium-sized operations are discussed*

**INTRODUCTION**

Currently, the federal government has complex regulations that limit the amounts and types of pollutants that can be released. Most federal regulations also require companies to obtain permits to emit pollutants. In the 1970's and 1980's companies responded to these regulations by treating the waste streams that were created during their manufacturing processes. This approach to pollution control has been somewhat successful in reducing toxic emissions from large, stationary sources of pollution (GAO, 1992). However, further progress has required a change in tactics (Occupational Hazards, 1993). Recognizing this need, the Environmental Protection Agency (EPA) and comparable state agencies have begun to change their focus from one of controlling emissions to encouraging prevention of toxic releases.

State and federal regulators have turned to economic incentives, such as toxic use fees or tax programs, as a means of encouraging pollution prevention. Theoretically, these incentive programs force offending companies to include the costs of polluting the environment in their production processes. In order to maintain their desired profit margins, these companies are encouraged to alter their operations to avoid paying the associated fees. In the past, corporate environmental policies have focused on strict compliance with traditional regulations and control of existing waste streams (Berry & Rondinelli, 1998). They contend that, more recently, some

corporations have shifted their focus toward the actual elimination of waste streams. This prevention strategy represents a more progressive approach. Case studies, such as *Green Ledgers* (Ditz, Ranganathan & Banks, 1995), illustrate how some very large corporations have made these changes. However, small to medium-sized companies have not necessarily made this change to the more progressive policies. The purpose of this research is to look at small to medium sized companies and examine managers' perceptions of the types of regulation that would have the greatest impact on corporate policy.

### **REGULATORY POLICIES**

The federal government maintains a set of strict environmental laws designed to limit the amount of toxic material that companies can legally emit. For example, the Clean Air Act establishes air quality standards and permitting requirements for polluters. The Clean Water Act insures the safety of the U.S. waterways. It also establishes permitting requirements for companies that discharge waste to water. Another piece of legislation, the Resource Conservation and Recovery Act covers the generation, transport, treatment, storage and disposal of hazardous waste. Finally, Superfund legislation (the Comprehensive Environmental Response, Compensation and Liability Act and the Superfund Amendment and Reauthorization Act) requires that entities be held liable for cleaning up contamination to their own and other properties regardless of when that contamination took place. It also contains provisions for companies to publish an annual inventory of all toxic releases.

Government enforcement efforts concentrated on those companies which had not obtained the correct permits and those which were not properly treating their waste streams (Adler, 1996). These laws are still in place; however, states have been augmenting the traditional regulations with economic incentive programs to achieve greater reductions in pollution levels. Economic incentives can take a variety of forms. Stewart (1993) indicates there are four types of market-based incentives that have been proposed:

- Taxes or fees that require the offending party to pay to pollute
- Transferable "permits to pollute" that a firm can sell if they emit less than the prescribed amount of the particular substance
- A deposit on hazardous materials that can be entirely or partially returned when the material has been properly disposed of or recycled
- Public disclosure requirements that would allow consumers to shift their demand for products to more environmentally responsible firms

Stewart (1993) indicates that taxes and permits have been used most widely. Transferable permits are used in this country; however, their use is concentrated primarily in the utility industry. This research focuses on taxes and fees as the set of incentive programs to examine.

These programs can include many different types of incentives. For example, some states (Massachusetts, Minnesota and Ohio to name a few) have levied toxic use or emissions fees on individual facilities based on the amount of materials used or released. These payments are, in effect, taxes on undesirable behavior. The goal is to change the costs incurred by these offending companies to the point where they will avoid or limit undesirable behavior. From an economic standpoint, a curative tax is the preferable solution to the problem of a market failure of this type (Westin, 1993). If the tax rate can be set correctly, the tax will have the desired effect on the behavior of the producers.

There are other forms of tax incentive programs to consider. For example, it is possible to provide tax subsidies to encourage desirable behavior. These subsidies might include tax credits, tax exemptions or accelerated tax deductions. In granting these subsidies, states, such as Oklahoma, Oregon, New Jersey and Rhode Island provide a reward for reducing pollution.

These types of incentives can encourage pollution control as well as pollution prevention. The firm will consider a wide variety of alternatives with which to achieve reduction in their overall costs. From the firm's point of view, these mechanisms allow for a greater degree of corporate flexibility in meeting the desired goal (Berry & Rondinelli, 1998; Housman, 1996). In addition, the company has more control over its own operations. One solution to the pollution problem is not forced on all companies. Each facility can determine the most cost effective means of reducing their emissions of toxic materials (Hahn, 1989).

The economic incentives discussed here take advantage of a firm's propensity to maximize profits in a manner of their own choosing. On the other hand, firms wish to comply with traditional regulations in order to avoid punishment and additional cost. As indicated previously, the purpose of this research is to understand which type of approach has the greatest influence on the environmental policies of small to medium sized firms.

### **METHODOLOGY**

Surveys were mailed to facilities that emit toxic materials into the environment. Included were firms in the printing and wire and cable industries from among those filing Toxic Release Inventory (TRI) information for the year of 1994. These facilities were identified through the Right-To-Know Network (RTK NET) which is sponsored by OMB Watch and the Unison Institute. Both industries are subject to air, land and water regulations and the firms tend to be small to medium sized. Facilities in both industries are dispersed widely throughout the country. These two industries represent different types of operations with respect to the processes and types of toxic materials used. Members of both industries could potentially benefit under the types of incentive programs discussed earlier.

Surveys were mailed to the environmental contact person listed on the TRI reports for a total of 469 separate facilities. Of this total, 309 were printing facilities and the remaining 160 were wire and cable operations. The useable response rate was approximately 19% and was not statistically different between the two industries. The Small Business Administration (SBA) defines small businesses by industry classification. To limit the study to small and medium sized entities, responses from either type of facility with over 1000 employees were excluded.

### **RESULTS**

The respondents provided information including their size, the toxic emissions reported on their TRI filing for 1995, and the ozone attainment status of the facility location. Analysis of the responses (Table 1) reveals some significant differences between the industries.

The printing industry emitted significantly more toxic materials than those in the wire and cable industry. This result holds for both the absolute air emissions and the emissions scaled by size, as measured by the number of employees. The sales revenue and the number of employees, both proxies for size, were not significantly different across the two industries.

The survey included questions regarding general facility information, data from their TRI submissions, corporate motivating factors and state policies and incentive programs. The facilities represented in this survey were located in 31 different states with no more than seven facilities in any one state. It is apparent that the size of these facilities, as measured by sales and number of employees, varies widely. Roughly 41.2% of the respondents reported having a full-time environmental specialist, and 80.2% of them had pollution prevention plans. Of these plans, 64.8% included measurable goals. Thirty-one, or 36.9% of the respondents, indicated that they are located in an ozone non-attainment area. Of those filing TRI data in 1994, 84% indicated that they were still required to file this information for 1995. The TRI data includes reduction activities that companies have undertaken during the previous year. In this sample, 49.9% of facilities reported reduction activities of some type. Of those facilities that actively sought to reduce emission levels, roughly half of them reported maintaining good operating procedures (51.3%), modifying raw materials (53.8%) and altering production processes (48.7%) as the means by which their reductions were achieved.

**Table 1 - Industry Comparisons of Select Variables**

<u>Variable</u>	<u>Mean Value</u>	<u>Stand. Dev.</u>	<u>N</u>	<u>Sig. of difference*</u>
Number of Employees	Print: 285.6	302.2	58	.154
	Wire: 215.9	148.0	28	
Sales Revenue (millions)	Print: 73.3	125.9	28	.958
	Wire: 75.2	59.4	15	
<b>Emissions (000's lb.):</b>				
Air	Print: 107.9	240.6	34	.036
	Wire: 17.1	24.7	26	
Land	Print: 4.3	16.0	25	.982
	Wire: 4.4	8.7	23	
Water	Print: 2.0	6.1	25	.119
	Wire: .1	0.4	23	
<b>Total Emissions Scaled by Employee Size</b>	Print: 810.4	1691.7	26	.047
	Wire: 111.2	209.1	22	

\*Test for the significance of the difference in means for the two groups

### Company Motivating Factors

Given the numerous alternatives for regulatory approaches, it is important to know how much influence each method has on shaping company environmental policy. It is important to note that not all respondents would be expected to have direct experience with each type of incentive. This lack of experience does not preclude the manager from understanding the implications and judging the importance of the possible policies. Table 2 is a summary of the results of this issue.

Factors with higher mean scores can be interpreted as having a greater level of importance. *Minimization Of The Cost Of Your Operations* was judged as the factor having the greatest impact on the firms' decisions. The responses to this factor were significantly higher than those for the next ranked factor ( $p = .01$ ). The fact that companies would be most interested in minimizing the costs of their operations is not surprising. Managers are interested in maintaining and improving financial performance; a focus on cost is consistent with that end.

Facility environmental personnel ranked compliance with a traditional command and control regulatory requirement as the second most important factor – *Regulations Specifying Maximum Emissions* . . . Based on the Wilcoxon Signed-Ranks test, the importance granted to this factor was not significantly greater than the ratings given to *Environmental Liability Minimization* (third in the rankings), or to *Tax Credits For Pollution Control/Prevention* (fourth in the ranking). Maximum emission standards have been around a long time, and they carry stiff penalties for non-compliance. In essence, companies must comply with these requirements in order to continue operations.

**Table 2 - Company Motivating Factors**

<b>(Level of Importance in Determining Company's Response to Environmental Issues)</b>			
<i>5 = great deal of importance, 3 = neutral, 1 = no importance</i>			
	<u>Rating</u>	<u>Rank</u>	<u>N</u>
Technical Assistance Offered by State Agency	3.48	9	84
<b>Tax Credits for Pollution Control/Prevention</b>	<b>3.90</b>	<b>4</b>	<b>84</b>
Property, Sales or Use Tax Exemptions	3.83	5	84
Some Form of Toxic Use or Hazardous Waste Fee	3.51	8	84
<b>Regulations Specifying Maximum Emissions With Specified Penalties For Noncompliance</b>	<b>4.08</b>	<b>2</b>	<b>84</b>
<b>Minimization of The Cost of Your Operations</b>	<b>4.36</b>	<b>1</b>	<b>84</b>
<b>Environmental Liability Minimization</b>	<b>4.05</b>	<b>3</b>	<b>84</b>
State Req. for Pollution Prevention Planning	3.53	7	83
State Permitting Requirements for Emissions of Specific Chemicals Over Predetermined Limit	3.82	6	84

As indicated, income and property tax incentives were ranked fourth and fifth respectively. They are economic incentive programs that have been tried in various states and it appears they would provide motivation to reduce toxic emissions. Other prevention initiatives did not rank as highly. While the use fees and the tax reductions both offer economic incentives to reduce emissions, managers preferred the chance to reduce an existing cost (income/property tax) rather than to reduce a possible additional cost (toxic use fees). Given their sensitivity to cost, this response makes sense. Costs would remain the same or decrease in one case. With the use fees, costs would undoubtedly increase.

There was a high degree of correlation between the rankings of the factors between the two industries. Overall, the internal factors (sensitivity to cost and liability) and a traditional regulatory factor (maximum emission standards) were rated higher by members of both industries

than the economic incentives. However, some differences did appear when comparing the average responses to particular factors. For example, wire and cable firms responded more strongly to the issue of cost minimization. In addition, the importance placed on permitting requirements by the wire and cable firms made it fourth in their ranking.

While economic incentive programs may offer more flexibility and a greater degree of control over the facility's environmental response, regulatory compliance is a central issue for facilities within both of these industries. This information suggests that only after companies satisfy their legal requirements for the environment, can they consider the possible benefits of economic incentive programs. One environmental manager posited that these economic incentives represent "the icing on the cake." That is, environmental managers are often extremely busy monitoring compliance with emissions and permitting regulations. They may not have the time or expertise to take advantage of economic incentive programs.

### Perceptions of State Policies and Incentive Programs

The facility personnel perceived that state regulators emphasize traditional regulatory solutions more heavily. The average perceptions for the respondents, the resulting rankings and a variety of other information related to these perceptions are included in Table 3.

Table 3 - State Pollution Prevention Policies and Incentive Programs (N = 88)

<i>(Relative importance placed pollution control and prevention by regulators in your state)</i>				
	<u>Mean Value</u>	<u>Rank</u>	<u>Didn't Know</u>	<u>Perception of Use vs. Importance</u>
Technical Assistance by a State Agency	3.70	4	17	.318*
Tax Credits or Deductions for Pollution Control/Prevention Investments	2.98	6	37	-.837*
Property, Sales or Use Tax Exemptions for Pollution Control/Prevention Investment	2.73	7	40	-1.0*
Toxic Use or Hazardous Materials Fee	3.61	5	16	.219
Regulations Specifying Maximum Emissions/Specified Penalties For Noncompliance	4.17	1	22	.035
Pollution Prevention Planning & Reporting	3.90	3	14	.439*
Permitting Requirements for Exceeding Preset Limits.	4.07	2	21	.136

\* The difference between the *perception of use* of these regulatory policies and the *importance ratings* given to them are statistically different at the .05 level

Table 3 indicates that traditional regulatory approaches were perceived to be the most important within the represented states. Specifically, respondents perceived that states emphasize maximum emission standards and permitting requirements most heavily. The perceived use of economic incentive programs was low relative to other environmental policy strategies. The average level

of perception on all these regulatory programs did not vary by industry. In fact, the rank order of these average perceptions was identical for both the printing and the wire and cable firms.

In addition, no state was represented in the analysis by more than seven respondents, so individual state policies should not be driving the results. The perceived lack of emphasis on the economic incentive programs may either reflect actual practices or the lack of familiarity with existing state programs. That is, 42 to 45% of respondents indicated that they did not know whether these incentive programs were even available within their state. For the individuals that did record a perception, some programs may be over or under emphasized. The final column in Table 3 indicates the mean value of the difference between the managers' perceptions of regulatory use (Table 3) with their own level of importance placed on the individual strategies listed (Table 2). Overall, respondents perceived that income tax credits and property, sales and/or use tax incentives were underutilized by these states. In other words, respondents reacted more strongly to the motivating power of these policies than they did to a perception of their use.

This same set of respondents indicated that pollution prevention planning and technical assistance were stressed more by the regulators than the corresponding level of importance companies placed on it would warrant. On the other hand, environmental personnel seem to have matched the level of importance placed on the more traditional policies (maximum emissions standards and permitting requirements) to their perception of the emphasis placed on these types of regulations. In other words, company practice has been adjusted to conform to the perceived level of expectation regarding regulatory compliance.

### **Limitations**

Only printing and wire and cable companies were selected for this research. Had other industries been chosen, results may have been different. In addition, other factors may need to be considered. For example, if a particular firm is or has been under the scrutiny of the regulators, then that firm's attitude towards motivating factors may also be different. A lack of data prevented meaningful analysis of this issue. Examining other industries, which regulators have targeted may reveal additional information.

### **IMPLICATIONS FOR SMALL AND MEDIUM-SIZED FIRMS**

Based on the information listed in Table 2, cost minimization appears to be a major concern for the responding firms regardless of the industry. Typically, the environmental compliance function within a company is viewed as a cost center and, as such, controlling these costs is very important. As a first step toward lowering the costs of using toxic materials, companies should practice good housekeeping within their facilities. Make sure that the equipment is in good working order and that no toxic materials are escaping the process due to poor maintenance or operating procedures. These are relatively low cost changes that can help all firms to minimize problems associated with accidental releases of toxic materials. In addition, businesses should seek out relevant recycling and/or waste exchange efforts within their area. These programs offer positive solutions to multiple businesses dealing with the disposal of waste streams.

Sensitivity to cost minimization can lead companies to understand what drives environmental costs. Studies, such as those outlined in *Green Ledgers* (Ditz et al., 1995), illustrate how a true understanding of costs by large firms has led to significant reductions in toxic releases as well

as operating costs. These kinds of results are available to smaller companies as well. Through their own efforts or with the help of state technical assistance programs, company managers must think beyond the bounds of their current operating procedures and systems. Technical assistance programs are often geared to smaller businesses in an effort to provide them with needed environmental expertise. Service providers can make assessments of current operations and provide suggestions for possible improvements in environmental performance. These suggestions may include proposed changes in the inputs or the processes used by particular businesses. In addition, the technical assistance providers should be able to help businesses identify and analyze all relevant costs to consider when making such a change. Trade associations and equipment manufacturers may also provide comparative cost and quality information.

In modifying inputs and the processes themselves as a result of this kind of cost analysis, managers may discover they are eligible to take advantage of economic incentive programs. Technical service providers and accounting professionals should be aware of available tax incentive programs. Both groups are well suited to help with cost-benefit analysis of alternative plans. If the resulting changes eliminate some waste streams, they should also eliminate time spent on monitoring and ensuring compliance with relevant regulations. For small businesses time is an important resource, and environmental managers could then devote more time to other problems.

In addition, managers must question all costs and their relationship to environmental emissions. These same managers might then reevaluate the relative level of importance of the set of factors included in Table 2. As company managers make progress toward societal goals of pollution reduction they can also realize additional profitability for their firms. This concept is a powerful one and can serve to motivate change in company and regulatory policy. Further research into the determinants of this change should be of interest to both business managers and policy makers.

In addition, effective environmental management requires a company-wide effort. Top management must be committed to the idea of pollution prevention, and information systems must support this goal. Furthermore, environmental managers are not necessarily in the best position to initiate efforts to take advantage of tax incentive programs. The accounting function must step in to research the potential benefits to be gained. Finally, companies might consider lobbying their state legislators for change in state regulatory policies. Individual efforts might go unnoticed; however, industry groups would be more effective in demanding alternative programs. Trade associations, technical assistance providers and environmental groups within a local area might provide needed support for any lobbying efforts.

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