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ENVIRONMENTAL PROGRESS: WHAT EVERY EXECUTIVE SHOULD KNOW

BY LYNN SCARLETT AND JANE S. SHAW

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- PS-12 **Who Will Save the Wild Tiger?**
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- PS-13 **The Common Law: How It Protects the Environment**
Roger E. Meiners and Bruce Yandle
- PS-14 **Bootleggers, Baptists, and Global Warming**
Bruce Yandle
- PS-15 **Environmental Progress: What Every Executive Should Know**
Lynn Scarlett and Jane S. Shaw

CONTENTS

TO THE READER

INTRODUCTION

PAGE 1

ENVIRONMENTAL PROGRESS: FOR THE RECORD

PAGE 2

THE CAUSES OF ENVIRONMENTAL PROBLEMS

PAGE 8

ADDRESSING POLLUTION PROBLEMS

PAGE 13

THE REGULATORY APPROACH

PAGE 14

NEW REGULATORY RHETORIC

PAGE 17

WHAT MARKETS ARE

PAGE 22

WHAT TO DO ABOUT REGULATION

PAGE 22

CONCLUSION

PAGE 26

NOTES

PAGE 27

REFERENCES

PAGE 28

INDEX

PAGE 33

TO THE READER

The purpose of this paper, “Environmental Progress: What Every Executive Should Know,” is to give business executives a better understanding of the dynamic social and economic settings that shape environmental problems and the opportunities for addressing those problems. Its insights should help executives meet environmental challenges with a principled approach that reflects the importance of consumer choice, innovation, and market competition.

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“**T**he air people
breathe is much cleaner today
not because of the ideal handed down
from Washington, but because
society wanted it so.”

—David Schoenbrod
New York Law School

INTRODUCTION

Environmental problems are among the most difficult facing business executives. Executives want to be good environmental citizens, but they are routinely pilloried for polluting the air and water, for using up valuable natural resources, and for placing profits above protection of the environment. As everyone knows, such attacks have fueled an enormous growth in regulations. Men and women in business must devote increasing amounts of time to understanding and conforming to complex rules, some of which do little to improve health or the environment despite the large expenditures they require.

Given this situation, business executives need an intellectual framework to guide their decisions about environmental matters. Such a framework would apply a principled approach to the problems that arise daily. It would enable executives to better identify and support policies that meet environmental challenges while also strengthening market competition, spurring innovation, and maintaining customer choice.

The approach we outline here has been developed through consultation with business executives, a review of literature on

environmental economics and management, and our own experiences with environmental policy and practice.¹ Specifically, it is based on the growing understanding of:

- how the rights and responsibilities of ownership provide incentives for environmental stewardship; and
- the importance of local knowledge and experience in addressing problems.²

ENVIRONMENTAL PROGRESS: FOR THE RECORD

Just as people sometimes litter, businesses sometimes pollute. Just as some people are reckless, some businesses are wasteful. However, over time, the environmental record of business is good.

- Businesses have become cleaner.
- They use fewer materials per unit of production.
- They create the technology that enables consumers and industry to conserve resources, minimize pollution, and enhance their surroundings.

Many of these accomplishments have occurred as a natural consequence of a competitive marketplace. Others have occurred as the result of deliberate efforts to reduce pollution or enhance the environment—either in response to regulations or to market forces.

Prices and Profits: Friends of Conservation

The private sector's record in conserving natural resources is impressive. Even though industry is often accused of using up natural resources for sometimes frivolous purposes, in fact the efficient use of resources is a hallmark of business.

Consider the aluminum beverage can, a familiar everyday

container produced by the billions each year. According to William F. Hosford and John L. Duncan (1994, 48), manufacturers of aluminum cans “exercise the same attention and precision as do makers of the metal in an aircraft wing.” Years of research and development have made the walls of cans thinner than two magazine pages yet able to withstand more than 90 pounds of pressure per square inch.

This improvement is more than an engineer’s delight. It is testimony to the ability of industry to reduce its use of materials. Today’s aluminum cans are at least 27 percent lighter than they were in the 1960s, and they are 80 percent lighter than state-of-the-art steel cans of three decades ago. And the search for material reduction continues. Every additional 1 percent reduction in aluminum that the industry can wring out will save \$20 million or so in metal costs.

Aluminum is not an exception. The history of beverage packaging is a history of resource reduction—using less material per unit of output. Aluminum’s success forced producers of other materials to become more efficient as well. Steel, the first metal for beverage cans, dropped out of the beverage-can race, but plastic and glass manufacturers improved their use of resources. Instead of heavy bottles and cans, we have lightweight ones, whether of aluminum, glass, or plastic.

Beyond packaging, the profit motive has led to reductions in material use in industries from forest products to automobiles.

- Steel high-rise buildings today require 35 percent less steel than the same building would have required two decades ago (Scarlett 1997, 11).
- A fiber-optic cable made from 60 pounds of sand can carry many times more information than a cable made from 2,000 pounds of copper (Scarlett 1997, 11).
- Improvements in lumber production have reduced wood losses from 26 percent in 1970 to less than 2 percent in 1993 (Wernick, Waggoner, and Ausubel 1997, 130–34).

Surprising Reductions in Pollution

In the late 1970s, two economists surveyed all the data they could find indicating long-term environmental trends. They were surprised. Concentrating primarily on the period between 1940 and 1975, they found that “the trends in environmental quality run the gamut from steady deterioration to spectacular improvement.” They had expected that “virtually all forms of environmental damage were increasing and that, in the absence of powerful countermeasures, they would continue to accelerate more or less steadily” (Baumol and Oates 1995, 444).

One reason for the improvement is the often-maligned profit motive, which has actually placed a steady downward pressure on pollution. For example, smoke is a sign of poor combustion, indicating that fuel is being lost to the atmosphere through the smokestack. Throughout history, competition has forced firms to minimize all costs, including the cost of unburned fuel. Over time, smoky chimneys gave way to better combustion or cleaner fuels. Emissions of air pollutants declined.

Indeed, a number of analysts have studied the history of air pollution. They discovered that emissions of some critical air pollutants were going down significantly well before passage of the federal Clean Air Act (Crandall 1983, 19; Goklany 1999; MacAvoy 1992, 96–104; Portney 1990b, 51).

Other factors also have spurred business to reduce pollution:

- *The common-law tradition.* Polluters are liable for the harm they cause. Individuals and owners who are harmed can sue in court for relief. If they can show the cause of the pollution, courts may require that damages be paid or enjoin the pollution. We have a long history of such protection.
- *Protection of reputation.* Companies want to preserve their reputations. Their “brand name capital” is at stake if customers perceive them as polluters.

- *Public pressure.* The public has pushed successfully for laws and regulations to reduce pollution. Regulation of pollution on a local basis in the United States goes back to colonial times.
- *Changing attitudes.* Businesses are situated in a larger social culture whose values are gradually but constantly changing. This change reflects, in part, higher incomes. When requirements for basic food and shelter absorb the attention of most of humankind, many environmental values are neglected. But as basic survival needs for most people have been met in the United States, people have become more willing to devote income to greater environmental protection.

Business practices reflect these changing values. In the late nineteenth century, the focus of business was on mass-producing goods that could be sold cheaply to large numbers of people. Through most of the twentieth century, the focus was on streamlining production, fine-tuning product quality, and tailoring products to specific consumers. By the late twentieth century, as people were placing more value on the quality of life, businesses began to emphasize reducing environmental impacts from manufacturing processes and products. Many businesses now routinely incorporate environmental considerations into their process and product design. This emphasis is sometimes termed “industrial ecology.”

Some businesses are even developing their central business strategy around environmental goals.³ Increasingly, financial institutions track environmental risk. According to *Business Wire* (8 October 1997), one firm, Innovest Capital Risk Advisors, evaluates firms by reviewing their historical liabilities, operating risks, and potential exposure to risk and relates this environmental risk performance to the firms’ share-price performance. Their findings show that “eco-efficiency”—how well companies manage environmental risks and exposures—is a strong indicator of superior corporate management, superior financial performance, and shareholder value.

Whether business executives embrace the new environmental

values or simply resign themselves to them, they recognize the existence of these values and the pressures they exert. Companies that deal effectively with these pressures are likely to do well and those that do not will falter.

Challenging Conventional Wisdom: The Love Canal Story

One reason that some people criticize business on environmental grounds is that they have absorbed the popular view that corporate malfeasance is widespread and to be expected when regulation is weak. The story of Love Canal epitomizes the popular view of business.

Indeed, the story sounds bad for business: A company used an old canal bed in the city of Niagara Falls for a waste dump. Twenty-five years later chemicals leaked out, injuring children and coloring lawns. This news frightened local residents, created a national chemical scare, and led to the passage of a law that taxed chemical companies to clean up waste dumps—a law now known as Superfund.⁴ The law was designed to stop the “ticking time bombs” around the country.

Yet seldom has an environmental problem been so misunderstood. Eric Zuesse, writing in *Reason* magazine in 1981, discovered by reading through old records that it was the Niagara Falls Board of Education, not Hooker Chemical Company, that had acted irresponsibly (Zuesse 1981).

Love Canal was an empty canal bed that Hooker bought in the 1940s for disposal of chemical wastes. After preparing the site and using it for some years, the company sealed the dump with clay. For the most part, it used state-of-the-art techniques that were as stringent, as it turned out, as national regulations in effect in 1980 (Stroup 1989, 870).

In 1952, the Board of Education of Niagara Falls, looking for land on which to build a school, pressured the company, under threat of condemnation, to sell land that included the dump. Hooker ultimately sold it to the board for one dollar. Hooker specified in the deed that the land had been filled with chemical waste products, and Hooker officials escorted school board officials to the

property and made test borings in their presence to confirm the presence of chemicals. In addition, the company tried to include a clause in the deed that would assure that the land over the dump would be used only for a park, but the board refused that limitation.

As time passed, the school board sold off some of the land to a developer—exactly what Hooker had warned against. Most importantly, the school board allowed sewers to be built that broke through the protective clay wall. Later, construction through part of the property also exposed chemicals, and, ultimately, chemicals seeped into people's homes, bringing about the famous Love Canal scandal.

Constrained by liability, as private companies and private citizens are, Hooker for the most part acted properly. It covered the dump and informed the buyer of its potential danger. But the Board of Education disregarded the dangers. As public officials, the board members were not personally liable for their actions. They knew of the dangerous conditions before selling, but were too concerned about providing education at a reasonable cost to heed the warnings.

What Love Canal Teaches Us

A single example such as Love Canal cannot justify general conclusions. However, the case is instructive. Not only does it force us to question some “conventional wisdom” about environmental matters,⁵ it also sheds light on the past and how environmental problems were addressed in the past.

The case shows that liability, enforced through the courts under common-law rules, constrains private-sector actions and that Hooker Chemical responded to these liability constraints. Yes, it placed hazardous chemicals in the ground, but contained them on its own property and took steps to keep the land from being used in ways that might lead to harm. Ultimately, in federal court, Hooker was held negligent for not having done enough to warn the school board (Meiners and Yandle 1998, 13), though the court recognized that Hooker had attempted to limit use of the contaminated land.

The Love Canal case shows that historically companies, constrained by legal precedent, acted to avoid causing harm from pollution. The resulting protection extended to individuals of modest

means and small power in the community. While it was not perfect, it prevented or corrected a great deal of environmental harm (Meiners and Yandle 1998).

Public-Sector Pollution

Ironically, given the attention paid to Love Canal and other hazardous waste sites, the contamination from Love Canal is small compared to the contamination now acknowledged to exist at Department of Defense and Department of Energy facilities. For example, the final cleanup tab for all Superfund and military sites in Colorado alone may exceed \$12 billion, or \$46 for each U.S. citizen. Of that figure, \$11.8 billion will go toward cleaning up two government sites. Only a small fraction of the costs will be for “orphaned” sites in which the former private owners are now bankrupt or cannot be located (*Solid Waste Digest* 1998)—even though that was the original purpose of the Superfund legislation. Colorado is not unique. The *New York Times* reported (1 September 1991) that hazardous waste per acre was twice as high on federal land as on private land.

THE CAUSES OF ENVIRONMENTAL PROBLEMS

Now that we have challenged some conventional views, let us take a look at the reasons behind environmental problems. To communicate meaningfully about environmental matters, it is helpful to divide environmental problems (as some do rather jokingly) into two major areas: “romance” and “sludge.” Romance refers to the protection of natural landscapes and wildlife. Sludge refers to the pollution problems that manufacturers face almost daily.

“Romance”—The Tragedy of the Commons

It is well known that people who own property have an incentive to take care of it, since the value of property tends to increase through good stewardship and to fall through negligence or dam-

age. In contrast, ownership by a large number of people can pose difficulties, and non-ownership can lead to environmental disaster. As Aristotle said more than two thousand years ago, “What is common to many is taken least care of, for all men have greater regard for what is their own than for what they possess in common with others.”⁶

Biologist Garrett Hardin coined the term “tragedy of the commons” to illustrate the problem when there is open access to an unowned resource (Hardin 1968). He described a commonly owned pasture, the kind that used to be found in medieval England and that still exists in places around the world. All the villagers are allowed to graze their livestock on the commons. As long as there are relatively few villagers, and few livestock, this arrangement works fine. But if the population increases, and too many people put their animals out to graze, overgrazing may result. The commons will gradually be destroyed as a grazing pasture.

No one wants such an outcome. Yet Hardin argued that it is almost inevitable in a situation where there is open access. Hardin explained that each villager has an incentive to add another cow, even though it puts too much pressure on the land. Individuals own the cows and receive the full benefit of the additional forage that another cow can eat. But they share ownership of the grazing land, so the impact on the land made by each cow is shared by all. A villager reaps benefit from adding the cow and only pays a small part of the cost.

If access to the commons were restricted, the situation would be different. Private ownership is the usual alternative to common ownership. If each villager had his or her own private pasture area, no villager would have an incentive to overgraze. Facing the decision of whether to add another cow, each villager would consider both the costs and benefits.

Another way to control access is through rules and traditions mutually agreed upon by those who use the commons. Especially where people have shared values, these rules and traditions often overcome the problem of the commons. Villages with common grazing land and fishing communities (including whalers) often prevent the tragedy of the commons (Leal 1996; De Alessi 1998).

Modern governments sometimes attempt to control commons situations, too. However, these attempts often fail. Sometimes these efforts override informal rules that previously avoided tragic results. In the Sahel part of Africa, for example, governments build water wells “open to all.” Yet traditionally in that arid region, the individuals who dug wells were able to control who used them. Ignoring such customs, some governments have inadvertently encouraged overgrazing and severe deterioration of the grassland surrounding the new wells (Stryker 1989, 95).

Similarly, regulatory attempts to manage ocean fisheries can worsen them. In Alaska, for example, regulations to shorten the halibut fishing season were introduced to stop overfishing. But fishermen responded by using bigger boats and sophisticated electronic equipment to locate and catch the fish more quickly. Even when the season was reduced to two days, the fishing fleet brought in the same total catch of halibut at a much higher cost—in what came to be a “dangerous derby” (De Alessi 1998).

“Sludge”—Difficulty in Defending One’s Rights

The tragedy of the commons explains many environmental problems, especially “romance” problems such as overfishing or overhunting. It can also explain “sludge,” because pollution can be understood very broadly as contamination of commonly owned air and water. An alternative way of thinking about pollution is to recognize that people may own the place into which “sludge” or pollution is dumped, and, if so, they have a right to keep it out. And even if they don’t own the place that is polluted, they have a right against personal harm. Unfortunately, sometimes people have difficulty defending their legal rights.

People’s legal rights against harms from pollution are rights that do not depend on legislated programs. As we saw with Love Canal, individuals can make a claim in court that harm has occurred from pollution. Usually, the claim is that a nuisance or trespass has occurred. The court looks for evidence of real harm and, when it decides that harm has occurred, decides what remedy is appropriate. The remedy may include compensation or an injunc-

tion against continuing the harmful action, or both.

This tradition of common-law protection does not simply affect the polluters who are taken to court. It also has a long-range impact. As the harms become known and courts take action to stop them, people or companies take steps to avoid liability.

For example, when paper mills began to be built along Wisconsin rivers in the nineteenth century, many paper companies routinely bought miles of downstream property. At the time, controlling pollution was extremely difficult. Because they didn't want landowners along the river to sue them for pollution, the mills allowed the waste to be diluted before it reached others' downstream property (Davis 1971, 777–80). This is not a satisfactory solution today, but it shows how court decisions lead companies to incorporate the costs of reducing or eliminating harm from pollution.

Because legal processes are costly and information problems exist, people sometimes have trouble defending their rights (and, in some countries, citizens do not have legal rights against such harms). Consider two situations. When someone's car is damaged, there is usually little problem in getting compensation. The person at fault is expected to pay for the damages, and courts will support such payment. It is more difficult to force someone to pay damages or to stop pollution that harms someone's breathing.

One reason is that there may be so many polluters (all the cars in the city, say) that it is impossible to blame any specific set of people. Also, there may be so many victims that coordination problems arise. Each individual victim may ask, "Why should I incur all the costs of providing for an injunction when the probabilities are that someone else will benefit from the prevention of harm?" (Epstein 1998, 228). As a result, people who could sue may not do so. Sometimes a public defender can overcome this problem by bringing a "public nuisance" action, but, for the most part, courts have taken the view that if everyone in a town or city is affected by a nuisance, the problem should be dealt with collectively, not by people suing one another.

In the past, pollution problems were usually fairly obvious. Today, pollution is more subtle. Respiratory problems, for example, may have multiple causes or different causes for different people,

so that it is hard to know whether specific pollution caused the problem. Often only long-term exposures result in any harm, and sometimes the time lag between the “event” and the “harm” is great, making it difficult to link the two.

There is also the question of what constitutes harm. Should occasional diesel fumes from an all-terrain vehicle be considered pollution if they cross the backyard fence? Judges face difficult challenges in evaluating such cases.

Another reason why the common law is not always effective is that it reflects public attitudes and culture. Judges’ opinions may reflect social attitudes. Richard Epstein (1998, xvi) observes that “frequently, judicial decisions and legislative initiatives both follow the same substantive path.” This may help to explain why the Love Canal case resulted in judicial condemnation of what appears now to be the wrong party (Hooker, not the Niagara Falls school board) as well as in a major new law.

So, while people have legal rights against pollution and, historically, courts have stopped polluters through common-law precepts of nuisance and trespass, not all environmental problems can be resolved this way.

It is important to keep in mind, however, that many of the difficulties posed by common law arise when regulation is used instead. Regulators face problems of establishing causation, determining what causes harm, and dealing with multiple sources and multiple victims of pollution. More importantly, political jockeying and special-interest influence are rife in regulatory approaches.

What About Externalities?

Thus, in our analysis, the fundamental causes of environmental problems can be reduced to two: the tragedy of the commons and the inability of people to defend themselves against pollution harm. This explanation of pollution differs from what is frequently taught in economics courses. There, pollution is an “externality” that constitutes a “market failure.” That is, somebody engages in a lawful activity such as manufacturing a product but allows waste—smoke or chemicals or heavy metals—to enter the air, water, or

soil. Because the cost of this pollution is external to (that is, not paid by) the people producing or purchasing the product, it is a “negative externality” that adversely affects third parties (Fullerton and Stavins 1998, 433). The proposed remedy is usually government action that requires the producer to reduce the waste or pay a tax designed to discourage its production.

This description is misleading, however. Most human action creates some impacts on others. Our clothes may offend others; our neighbors’ dogs may occasionally bark or their children may play their drums; the air conditioning unit of a neighboring apartment may rattle; leaves from our yard may blow into our neighbor’s. There are countless blurry realms where our actions intersect and impose negative (or sometimes positive) impacts on one another that are not accounted for in any economic transaction. Pollution is a vivid negative impact, but far from the only one.

We cannot eliminate all these impacts, and no one actually tries to do so. The challenge is to develop institutions and decision-making processes that help people in society discover which negative impacts really matter to people and how to reduce or eliminate them.

ADDRESSING POLLUTION PROBLEMS

Essentially, there are four ways to address pollution problems. They are: relying on the common law, relying on entrepreneurial activity, relying on informal social rules, and relying on governmental laws and regulations.

As we have seen, liability under common law helps people identify which impacts are harmful and how they can be remedied. Although common law has been largely supplanted by regulations (Meiners and Yandle 1998, 19), using courts remains an option in some instances. The genius of settling pollution problems through the courts is that decisions can differ from one place to another and can change as circumstances change. One community may be comfortable with roosters crowing at dawn; another may not. As a rural community changes to an urban one, its cus-

toms, traditions, and legal rules can change.

Almost without our realizing it, private entrepreneurship is also at work reducing (or eliminating) pollution. As people become frustrated with outdoor noises in crowded cities, for example, an entrepreneur comes up with soundproof glass for hotels and apartments, while another devises noise-cancellation headphones for use on airplanes (Rehmke 1998). Entrepreneurs sell bottled water to people who think that publicly provided water is unsatisfactory, and they develop home sites that preserve the natural environment (Anderson and Leal 1997).

Like the common law, entrepreneurial markets are dynamic and flexible. Success depends on finding new niches and new ways to satisfy the values and preferences of different individuals. Entrepreneurs who incorporate the natural landscape into residential developments, for example, are responding to changing environmental concerns and interests. Both common-law and entrepreneurial approaches can lead to mutually satisfactory outcomes. Such flexibility is rarely encountered with regulatory approaches.

Informal social rules also often evolve to address harmful impacts from human interactions, especially in small communities or private associations. Fishing cooperatives in Japan, for example, have limited polluting coastal activities (De Alessi 1998). But even in populated, heterogeneous cities, informal mechanisms exist for limiting harms. Business improvement districts have emerged spontaneously to informally reduce littering, loitering, or other nuisances in urban “commons” through cooperative “policing” efforts (Liebmann 1995).

THE REGULATORY APPROACH

To many people, these approaches aren't enough. The common law has the imperfections discussed above, and, in any case, regulations have largely supplanted common-law pollution cases over the years. Yes, entrepreneurial activity is vigorous (Scarlett 1999; Anderson and Leal 1997), but it succeeds only if enough people in the marketplace are willing to pay for better envi-

ronmental conditions. And informal rules may not develop when they're needed. Regulation and the political process are another way to respond to problems of pollution. For most people, addressing environmental problems means introducing regulations.

A Brief History of Environmental Regulation

Environmental regulations go back hundreds of years. In 1300, a Londoner was executed for burning sea coal, which had been outlawed to reduce air pollution (Baumol and Oates 1995, 447–48). In the United States, pollution regulations began to widely supplement common-law protections more than a century ago (Stern 1982). Such regulations were almost entirely local, because most environmental problems were local. Since it was costly to control pollution, these regulations often reflected the political factors within regions. Politicians weighed the desire for clean air, for example, against the loss of jobs that could result from tight regulations.

During the 1960s, this local emphasis began to change. As the United States experienced a long economic boom, many people had the leisure and the wealth to start embracing a wider set of values in their pursuit of quality of living. As they looked around, they saw substantial pollution of air and water. Steel mills, power plants, and other industrial companies emitted soot that could be dangerous. Companies released heavy metals into streams and, in a famous incident, the Cuyahoga River caught fire.⁷

Environmental activists, frustrated with the slow pace of local action, began to push for federal control. They feared that some states would become environmental “sinks,” attracting businesses that polluted heavily. They believed that the federal government would prevent that from happening.

Many executives, too, pushed for federal regulation. They thought that state laws would yield a patchwork of conflicting regulations that would pose nightmarish compliance problems for national businesses. Industry itself became a major promoter of new national environmental laws.

Beginning around 1970, Congress passed a series of major environmental laws covering air, water, and hazardous waste and

requiring protection of endangered species and assessment of environmental impacts. Just how successful these laws have been is the subject of scholarly dispute (Hahn 1996; Portney 1990a; Hazilla and Kopp 1990). Initially, however, the legislative achievements were dramatic, and clearly environmental progress has occurred. Although the laws may not have been as important in this progress as public opinion generally claims, changes in environmental quality have been substantial (Easterbrook 1995; Bailey 1995).

Problems of Regulation

Business executives in the United States today know the problems of regulation from personal experience. Among the key elements are the following:

Lack of flexibility. Specification standards, which are still the prime vehicle of environmental regulation, stifle innovation (Porter and van der Linde 1995, 111). Detailed rules and regulations keep firms' environmental staff "chasing after the regulations" rather than searching for techniques to reduce environmental problems (Shaw and Stroup 1997, 19).

Tunnel vision. Inflexibility can lead to intransigence, as regulators act on the basis of their "tunnel vision" to achieve narrow goals. According to Supreme Court Justice Stephen Breyer (1993, 11), government regulators become so committed to a goal, and can pursue that goal without restraint, that they place demands on business that look extreme to anyone outside the confines of their agency. For example, the Environmental Protection Agency has insisted that a Superfund waste site be cleaned to the point where children can safely eat the dirt 245 days a year (Breyer 1993, 12). A few years ago, *Fortune* reported that the Environmental Protection Agency was requiring cities to remove 30 percent of the organic material in water discharged into the ocean. In Anchorage, Alaska, so much dilution from rain and snow occurred before the water reached the ocean that removing 30 percent of the organic material was technically impractical. Fish processors had to *add* waste so that it could

be removed to meet EPA standards (Dowd 1994, 98).

Diminishing returns. Past success in cleanup makes every additional step more costly. In the 1970s, we were plucking the proverbial low-hanging fruit from the tree, but today we are reaching for the higher fruit (Anderson 1998). Not only are additional cleanup steps more expensive, they accomplish less per dollar spent. For example, a typical automobile today emits a tiny fraction of the hydrocarbons that a car emitted before catalytic converters were added (Calvert et al. 1993). The change has been dramatic, but purchasing additional reductions will be extremely expensive, and the effect on ambient air will be relatively small.

NEW REGULATORY RHETORIC

Due to these problems, proponents of command-and-control regulation have been on the defensive in recent years. Yet pressure for expanding environmental regulation continues, sometimes in new guises. Proponents of more regulation have begun to adopt terms like the “precautionary principle” and “polluter pays” and to talk about “market-based” policies. While some of these concepts sound good, executives should be cautious when they are invoked.

The Precautionary Principle or “Safety First”

Popular rhetoric often states that “an ounce of prevention is worth a pound of cure” (an aphorism supposedly coined by Benjamin Franklin), or “better safe than sorry.” But elevating such folk wisdom to the level of a guiding principle is a mistake.

The late political scientist Aaron Wildavsky (1988) pointed out that there are two ways to deal with potential future risks. Anticipation, which embodies the precautionary principle, attempts to prevent the harm from occurring. Resilience—or adaptation—copes with dangers as they arise, while building knowledge and other resources for the future.

Certainly, risks such as earthquakes and floods and other natural disasters can be anticipated to some extent. It makes sense to take precautions that will reduce their effects. However, when there is great uncertainty about the timing, nature, or likelihood of a particular danger and about the effectiveness of measures to reduce the danger, anticipation may be a poor strategy. If the wrong harm is anticipated, the chosen measures may not work, and if the anticipated harm itself never occurs, resources will be wasted that could have been spent on more worthwhile actions. Building knowledge, investing in technology, and creating wealth makes us better able to respond to a risk that materializes, whatever its nature.

The precautionary principle is used to defend efforts to moderate global warming through tough limits on the use of fossil fuels. However, scientific uncertainty about climate change impacts suggests that resilience may be more appropriate. Twenty years ago, some scientists expressed concern that global cooling might be occurring (Schneider 1976). Had we had the same determination to “do something” as we do today about global warming, we might have accelerated burning of fossil fuel to hold off cooling.

Today, rather than aggressively cutting back on fossil-fuel consumption, we might do better to build up our knowledge base and increase our wealth and ability to address harms as they emerge. Indeed, the “precautionary” efforts that are underway, while undoubtedly costly to many nations’ economies, are likely to have little payoff either in altering climate patterns or reducing any adverse impacts from any temperature increases (Malakoff 1997; Bolin 1998; Green 1998).

Another problem with automatic use of the precautionary principle is that wholesale intervention to stop a danger may cause new ones. A few examples:

- Eliminating the chlorination of water might reduce one risk such as cancer that may be caused by excessive exposure to chlorine, but it may increase the much greater risk of communicable diseases. Failure to treat well water in Lima, Peru, led to an outbreak of cholera in Latin America, which caused 4,000 deaths in 1991. Some re-

searchers think officials stopped treating water because of U.S. Environmental Protection Agency studies showing a possible cancer risk from chlorine (Anderson 1991).

- Automobile air bags can save some people's lives but, according to the National Highway Traffic Safety Administration, they also kill children and lightweight adults (Nomani and Stern 1996, A14).
- Banning pesticides is likely to increase the costs of food so that lower-income people eat fewer fruits and vegetables. Since eating fruits and vegetables is believed to reduce the risk of cancer, eating fewer of these foods may cause more harm than did the pesticide residues the regulation was designed to eliminate (Ames and Gold 1996, 12, 27).
- Halting new agricultural technology such as biogenetic change means that more land must be devoted to farming rather than to open space (Avery 1991, 214).

Furthermore, the same dollars spent on one regulatory problem might be better spent on different actions that protect more people. The costs of saving or extending lives through regulation vary enormously. One study shows that a regulation of the Federal Aviation Administration could add an extra year of life for \$23,000, and a regulation of the Occupational Safety and Health Administration could do the same for \$88,000. However, the average EPA regulation costs \$7,600,000 for each additional year of life preserved (Tengs et al. 1995). Based on these figures, John D. Graham (1995, 1) estimates that 60,000 lives could be saved each year by redirecting regulation to other risks.

And if regulations lead to reductions in income, either through the loss of jobs or a slowdown in wage increases, there may be consequences to health. Studies show a direct relationship between lower income and higher rates of injury, illness, and death (Keeney 1997). The reason, explains environmental scientist Kenneth Green,

is that “people use their disposable income to weave what we might call a personal safety net around themselves and their loved ones. The more disposable income they have, the tighter the weave of their personal safety net. The less disposable income they have, the looser the weave” (Green 1998, 5).

The “Polluter Pays” Principle

“Polluter pays” is another aphorism to watch out for. The idea behind it is simple: If people pollute, they should pay the costs. This notion is consistent with the way that common law historically treated most polluters. The problem is that popular rhetoric can focus accountability on the wrong target.

- With Love Canal, all the ire was directed at Hooker Chemical Company, even though it acted more responsibly than the Niagara Falls school board did.
- The Superfund law, passed in the wake of Love Canal, was supposed to make polluters pay for cleaning up abandoned waste sites. However, companies that may never have contaminated a waste site have to pay the tax that runs the program, and simple accusation by the EPA can force a company to pay for cleaning up a site. Only after the cleanup is over (which typically takes twelve years) can a company dispute the cost, and then only on the grounds that the agency was arbitrary and capricious (Stroup 1996, 7–8).
- Policies in many European nations, supposedly based on “polluter pays,” require manufacturers of consumer products to take back discarded products (such as computers or other electronic equipment) or packaging from their products, or arrange for it to be recycled. Yet discarded products and packaging are not pollution. Packages provide benefits (product protection, sanitation, and marketing, for example) and only become pollution if they are

improperly discarded. Once a product has changed hands and reached a consumer, usually ownership and its responsibilities such as ensuring proper disposal change, too. Only under special lease or contract arrangements does ownership stay with the producer or retailer (Scarlett et al. 1997, 87).

“Market-Based” Environmentalism is Rarely Market-Based

A third rhetorical defense of regulation is the use of the term “market-based.” Almost all participants in environmental policy now pay some lip service to “market-based” environmentalism. But this term means different things to different people and, in most cases, has little to do with what we mean by markets.

One highly touted example of “market-based environmentalism” is tradable emissions. The Clean Air Act of 1990 incorporated trading in the provisions designed to reduce sulfur dioxide emissions from power plants. For each power plant in the United States, the Environmental Protection Agency sets the goal of a specific level of sulfur dioxide emissions. Firms that can reduce emissions below that value may sell these additional emission “rights” (or “credits”) to other firms for whom achieving the goal is more costly. Similar trading has also been proposed to accompany carbon dioxide reductions and laws requiring specific percentages of recycled material in packages.

Tradable credits do reduce compliance costs (Joskow, Schmalensee, and Bailey 1998). However, the role of the market is limited to trade after the goals have been set politically. The benefits of reaching the goal still may be less than the costs of compliance.

Another market approach is to use governmentally imposed charges, sometimes called “eco-taxes,” to influence consumer and producer choices. The idea is that some products, such as automobiles, create pollution and impose environmental impacts that are not reflected in their prices. “Eco-taxes” on these products, the argument goes, would raise prices and discourage people from buying them or lead them to use them differently. The taxes could create a fund that could be spent to mitigate the harmful impacts.

Such taxes appeal to many economists, but they pose technical problems (such as setting the appropriate amount of the tax) and political opposition. Where such taxes have been implemented, they often become just another source of public-sector revenue (Yandle 1998b, 132).

WHAT MARKETS ARE

Neither of these market-based approaches embodies key attributes of markets. Markets are voluntary activities through which potential sellers discover what people value and potential buyers discover what resources are available.

Many environmentalists, as well as many environmental economists, see markets as a way of correcting externalities (Fullerton and Stavins 1998, 433), but they fail to recognize what gives markets, and environmentalism based on markets, moral force. The moral force comes from the voluntary nature of markets. No one is coerced into buying or selling. It is true that not everyone has the same purchasing power in a market, but each individual is free to search for his or her best opportunity.

Because buyers and sellers in this voluntary context have an incentive to seek the best value for their time and resources, together buyers and sellers discover solutions that make each one better off—or else no trade takes place. The discovery of better solutions through search and negotiation through a noncoercive process is quite unlike the negotiations, disputes, and disagreements that characterize regulatory situations.

WHAT TO DO ABOUT REGULATION

While markets, situated within a setting of common-law rights against harm, can often advance environmental protection, businesses must deal with the current regulatory scheme. What can we do to make regulation more sensible and more flexible? Two changes could improve outcomes: decentralization of

regulation and the adoption of performance-based standards.

These are relatively small steps and reaching them will not be a panacea. If adopted, however, they will inject creativity and good will into the business of environmental regulation and may set the stage for greater freedom and cooperation in the future.

Decentralization

For three decades, environmental decisions have been thrust upward to the federal arena. Yet most environmental problems are primarily local. Although there are exceptions, environmental impacts are usually confined to relatively small areas, such as the stream outside a factory or the land around a waste site.

Decentralizing regulation means resolving environmental problems on a local level (Anderson and Hill 1996; Scarlett 1996 and 1999). Local people, those who usually bear the costs of pollution, are often willing to bargain with a polluter or potential polluter. They not only face the risks associated with a particular activity like logging or manufacturing, but also enjoy the benefits of these activities such as the jobs they provide. Bargaining can serve as a discovery process, revealing more accurate information about risks and benefits than is possible when decisions are made by a federal agency directed by Congress. Furthermore, decentralization allows businesses to work together in a local area, and permits a variety of experiments in different localities, allowing people to discover which ones work and which do not.

Decentralizing regulation has led to some flexible environmental programs that incorporate local knowledge, reflect the wishes of local citizens, and encourage reasonable resolution of problems. For example:

- The state of Illinois has a “brownfield” program that aims at bringing industrial development into areas where contamination has stymied development, often because of stringent cleanup laws. The Tiered Approach to Corrective Action Objectives (TACO) gives landowners, working with local citizens, a choice among different cleanup

levels. They can select which level is most appropriate given the projected use of the property. Once the cleanup is accomplished, local developers are issued a “no-further-remediation” letter. This letter becomes part of the chain of title for the property, prohibiting use of the site in ways inconsistent with the level of cleanup (Volokh, Scarlett, and Bush 1998, 23–25).

- In North Carolina, meeting federal regulations for industry and municipal sewage systems around the Tar-Pamlico Sound became extremely expensive, and yet the sound remained polluted. In an experiment, the EPA allowed local agencies, working with local industry and agriculture, to figure out a workable system. The result was a system of trades. Rather than tighten up further on their emissions, sewage systems and firms arranged to pay farmers to improve controls on fertilizer and herbicides. This solution improved water quality and kept the costs from escalating (Yandle 1998a, 58–60).
- Rahr Brewing Company in Minnesota benefited from a state process that allowed it to establish a new brewery through an effluent trading arrangement with local farmers. Rahr is paying farmers to reduce runoff (Peplin 1998).

Companies often recognize the benefits of bringing local people into decision making. Arco Chemical Company’s “Good Neighbor Policy” communicates information about the safety and quality of its operations to people who live near its plants. It also provides opportunities for observing its operations, and creates processes for resolving problems. Decentralization pushes decisions closer to where problems occur and to where the relevant knowledge exists.

Performance Standards

Regulations typically prescribe specific technologies that must be used to comply with environmental laws (Yandle and Maloney

1984). The problems with specification standards were vividly illustrated a few years ago when Amoco and the EPA conducted a joint study of Amoco's Yorktown, Virginia, plant to find out the impacts of regulations on the plant. They found that Amoco was spending \$2,400 per ton to control hydrocarbon emissions that could have been controlled for \$600 per ton if a more innovative approach had been allowed. Furthermore, Amoco was not addressing more substantial emission sources that didn't come under the regulations. Thus, air and water quality was poorer than would have been the case if Amoco had been allowed to concentrate on improving ambient air and water quality, rather than on ensuring compliance with existing laws (Shaw and Stroup 1997, 19).

Performance standards, in contrast to command-and-control regulations, allow individuals and firms to figure out how best to meet stated goals. Such a standard might require that overall air pollution be cut to a certain level but not specify the reduction stack-by-stack. Many states and, to a limited extent, the Environmental Protection Agency have begun experimenting with performance-based approaches.

- California has a toxic "hot spots" program. While not fully performance-based, it focuses on whether emission reductions are actually being achieved. If a parallel federal air toxins program, which specifies particular control technologies, were adopted in California, one chrome-plating rule would go from five pages to sixty pages (Volokh, Scarlett, and Bush 1998, 40).
- Illinois' Environmental Management System allows the state's environmental regulators to enter into agreements that let companies create their own environmental performance plans that establish facility-wide performance standards (Volokh, Scarlett, and Bush 1998, 36-39).
- Part of the success of the federal SO₂ emissions trading program may be due to the switch to a performance standard. The 1990 law that introduced the credits also freed

up restrictions in the 1977 Clean Air Act that had required power plants to use expensive sulfur dioxide scrubbers to reduce emissions. Under the new act, utilities could meet the standards by using low-sulfur coal if they wanted. Some did, and the price of scrubbers plummeted. (McCormack and Shaw 1996, 10).

CONCLUSION: A FRAMEWORK FOR ENVIRONMENTAL POLICY

Our goal in this essay is to help business executives approach environmental issues from principle rather than expediency. This means recognizing the beneficial impacts—to industry, those downstream or downwind, and to consumers—of clearly defined ownership and use rights and responsibilities, legal protection of those rights, local knowledge, and local involvement. While the implications of these factors may never be fully taken into account in public policy, business executives who understand their importance can edge policies in a direction that reinforces these principles. Two important steps, we believe, are to move selectively toward decentralization and performance standards.

Environmental pressures are not going to go away. As our nation, or any nation, becomes wealthier, we can afford to—and we do—devote more attention and interest to amenities and quality of life. We stop worrying just about putting food on our table and devote attention to what surrounds us—the quality of our air and streams, the beauty of our forests, the diversity of our wildlife. Today, the public is demanding that business be environmentally sensitive, as are workers and business executives themselves.

As demands grow and change, executives should maintain a principled approach. As we have indicated in this paper, the key lessons include the following:

- The search for profits leads to conservation and often encourages reduction of pollution.

- The conventional wisdom about business as the central cause of environmental problems is mostly wrong.
- Environmental harms often can be traced to open access to unowned resources and the inability of people to defend their common-law rights against harms from pollution.
- There are four ways to deal with pollution: common law, entrepreneurial response, informal social rules, and regulation. None is perfect, and each has a place.
- Popular rhetoric about polluter pays, the precautionary principle, and market-based environmentalism is often misleading.
- To improve regulation, begin with decentralization and performance standards.

With these ideas behind them, businesses will continue on the road to environmental progress. At the same time, they will help maintain a healthy, competitive marketplace in a free society.

NOTES

1. Background for this paper can be found in Scarlett (1997).
2. Economists will note that these precepts reflect the new institutional or property rights economics pioneered by Nobel laureate Douglass North and Austrian economics, particularly as represented by Nobel laureate F. A. Hayek.
3. For example, some companies are turning to “servicizing,” in which they seek to “deliver value through high performance functional sales rather than physical goods. The result: more value with less material.” See White (1998).
4. The correct name of the law, passed in 1980, is the Comprehensive Environmental Response Compensation and Liability

Act (or CERCLA).

5. Conventional wisdom about other environmental “disasters” has been shown to be wrong, too. Dangers from pesticides have been severely exaggerated, for example, as have estimates of the effects of acid rain and the “garbage crisis,” and fears that we are “running out” of energy and natural resources. See, for example, Bailey (1995).

6. Quoted in Durant (1939, 536).

7. The fire may have come about because regulation had overridden common law. The Cuyahoga River was regulated by the state of Ohio as an “industrial stream,” so that no suits against polluters were allowed (Meiners, Thomas, and Yandle 1999).

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SUBJECT INDEX

- Alaska: overfishing in, 10;
regulation of water quality,
16
- aluminum beverage can, 2–3
- Amoco, 25
- Arco Chemical Company, 24
- Aristotle, 9
- automobile, pollution from, 17
- California toxics program, 25
- chlorination in Lima, Peru,
18–19
- Clean Air Act, 4, 21, 26
- common law, 4, 7, 10–12, 14
- conservation, 2–3
- Cuyahoga River, 15
- decentralization, 23–24
- Defense Dept., 8
- diminishing returns from
cleanup, 17
- “eco-efficiency,” 5
- emissions trading, 21, 24, 25–
26
- Energy Dept., 8
- entrepreneurship, 14
- Environmental Protection
Agency, 16, 19, 20, 25
- externalities, 12–13, 22
- Federal Aviation Administra-
tion, 19
- fiber-optic cable, 3
- global warming, 18
- Hooker Chemical Company,
6–8, 12, 20
- Illinois: brownfield program
(TACO), 23; Environmental
Management System, 25
- income: regulation and, 19–20
- informal rules, 14
- industrial ecology, 5
- Innovest Capital Risk Advi-
sors, 5
- Japanese fishing cooperatives,
14
- liability, 4, 7, 10–12
- Love Canal 6–8, 12, 20
- lumber production, 3
- markets, 22
- “market-based” environmen-
talism: about, 17, 21–22;
emissions trading, 21, 24,
25–26
- Niagara Falls Board of
Education, 6–7, 12, 20
- Occupational Safety and
Health Administration, 19
- packaging, 20

PERC POLICY SERIES

- performance standards, 24–26
- pollution, air: 4, 11, 15, 16;
hazardous waste, 6–8, 16,
20; public sector, 8; water,
11, 15
- “polluter pays,” 17, 20–21
- precautionary principle, 17–20
- profit motive, 3–4
- Rahr Brewing Company, 24
- regulation: costs of, 19;
history of, 15; income
reductions and, 19–20;
problems of, 16–17; risks
from, 18–19
- reputation, 4
- resilience (adaptation), 17–18
- risks: agricultural technology,
19; air bags, 19; chlorina-
tion, 18–19; global warm-
ing, 18; pesticides, 19
- specification standards, 16, 24
- steel, 3
- Superfund, 8, 16, 20
- Tar-Pamlico Sound, North
Carolina, 24
- technology, 2–3, 19
- tragedy of the commons, 8–10
- tunnel vision, 16
- water wells in the Sahel, 10
- Wisconsin paper mills, 11
- Yorktown, Virginia, 25