

# Managing Environmental Issues

Growing public interest in protecting the environment has prompted political and corporate leaders to become increasingly responsive to environmental issues. In the United States and other nations, government policy makers have moved toward greater reliance on market-based mechanisms, rather than command and control regulations, to achieve environmental goals. At the same time, many businesses have become increasingly proactive and have pioneered new approaches to effective environmental management, often conferring a competitive advantage.

## **This chapter focuses on these key learning objectives:**

- Knowing the main features of environmental laws in the United States and other nations.
- Understanding the advantages and disadvantages of different regulatory approaches.
- Assessing the costs and benefits of environmental regulation.
- Defining an ecologically sustainable organization and the stages through which firms progress as they become more sustainable.
- Understanding how businesses can best manage environmental issues.
- Analyzing how effective environmental management makes firms more competitive.

Hewlett-Packard, a manufacturer of computers and printers, has long been an innovator in its environmental practices. In the 1990s, the company decided to move beyond merely preventing pollution to embrace a strategy of providing products and services that were environmentally sound throughout their life cycles. It appointed product stewards, each of whom was responsible for ensuring that a particular product minimized the use of hazardous materials, was safe to use, and enabled recycling or reuse. For example, the company initiated a program to take back and recycle used laser printer cartridges. In the early 2000s, Hewlett-Packard made a further commitment to “invent tomorrow’s sustainable businesses.” The company began an internal discussion of some radical questions. Did it want to be in the business of selling disposable printers, or in the business of selling printing services? Could printing services be delivered in an entirely sustainable way?<sup>1</sup>

In 2005, the European Union (EU) launched an innovative environmental policy—a system of tradable permits for carbon dioxide emissions. In an effort to curb global warming, the Europeans opted for a flexible, market-based approach. Under the new system, the European Commission (the EU’s governing body) allocated permits, or quotas, for carbon dioxide emissions to various member governments. They, in turn, distributed them to 12,000 plants across the 25 member states, including power generators, chemical factories, and pulp and paper mills. Companies that were able to cut their emissions of the greenhouse gases could sell their permits to others that had exceeded their quota, providing an incentive for them to reduce their pollution. Over time, the European Commission planned to reduce the number of permits in circulation, driving down overall carbon dioxide emissions. “Europe will be an example to the world,” said the chief executive of a trading exchange for the permits. “It’s the first time that you [will be] rewarded for being an environmentally friendly manager.”<sup>2</sup>

Environmental Defense, a leading environmental advocacy organization, believed that its old strategy of suing companies and lobbying legislators was not working well enough. Instead, the group tried a cooperative approach, working

directly with companies, including McDonald's, Dell Computer, Citigroup, and Starbucks, to improve their environmental performance. Environmental Defense also entered an innovative partnership with FedEx, the world's largest express transportation company, to develop a more environmentally friendly delivery truck. Environmental Defense scientists worked with FedEx and with Eaton, a truck manufacturer, to design a new hybrid vehicle, powered by both a conventional combustion engine and an electric motor, that burned 50 percent less fuel and decreased emissions by more than 75 percent. FedEx rolled out its first hybrid truck in 2004 and said it planned to replace its entire 30,000 truck fleet with the new model.<sup>3</sup>

In the early years of the 21st century, many businesses, governments, and environmental advocacy organizations became increasingly concerned that old strategies for promoting environmental protection were failing and new approaches were necessary. Government policy makers moved toward greater reliance on market-based mechanisms to achieve environmental goals. Environmentalists engaged in greater dialogue and cooperation with industry leaders. Many businesses pioneered new approaches to effective environmental management, such as product stewardship programs.

The challenge facing government, industry, and environmental advocates alike, as they tried out new approaches and improved on old ones, was how to further economic growth in an increasingly competitive and integrated world economy while promoting sustainable and ecologically sound business practices.

## Role of Government

In many governments, including the United States, the role of government is to protect the environment. Business has a few ways to minimize the impact of its activities on the environment. One way is to invest in clean technology. Another way is to invest in environmental protection. A third way is to invest in environmental protection. A fourth way is to invest in environmental protection. A fifth way is to invest in environmental protection. A sixth way is to invest in environmental protection. A seventh way is to invest in environmental protection. An eighth way is to invest in environmental protection. A ninth way is to invest in environmental protection. A tenth way is to invest in environmental protection. A eleventh way is to invest in environmental protection. A twelfth way is to invest in environmental protection. A thirteenth way is to invest in environmental protection. A fourteenth way is to invest in environmental protection. A fifteenth way is to invest in environmental protection. A sixteenth way is to invest in environmental protection. A seventeenth way is to invest in environmental protection. An eighteenth way is to invest in environmental protection. A nineteenth way is to invest in environmental protection. A twentieth way is to invest in environmental protection. A twenty-first way is to invest in environmental protection. A twenty-second way is to invest in environmental protection. A twenty-third way is to invest in environmental protection. A twenty-fourth way is to invest in environmental protection. A twenty-fifth way is to invest in environmental protection. A twenty-sixth way is to invest in environmental protection. A twenty-seventh way is to invest in environmental protection. A twenty-eighth way is to invest in environmental protection. A twenty-ninth way is to invest in environmental protection. A thirtieth way is to invest in environmental protection. A thirty-first way is to invest in environmental protection. A thirty-second way is to invest in environmental protection. A thirty-third way is to invest in environmental protection. A thirty-fourth way is to invest in environmental protection. A thirty-fifth way is to invest in environmental protection. A thirty-sixth way is to invest in environmental protection. A thirty-seventh way is to invest in environmental protection. A thirty-eighth way is to invest in environmental protection. A thirty-ninth way is to invest in environmental protection. A fortieth way is to invest in environmental protection. A forty-first way is to invest in environmental protection. A forty-second way is to invest in environmental protection. A forty-third way is to invest in environmental protection. A forty-fourth way is to invest in environmental protection. A forty-fifth way is to invest in environmental protection. A forty-sixth way is to invest in environmental protection. A forty-seventh way is to invest in environmental protection. A forty-eighth way is to invest in environmental protection. A forty-ninth way is to invest in environmental protection. A fiftieth way is to invest in environmental protection. A fifty-first way is to invest in environmental protection. A fifty-second way is to invest in environmental protection. A fifty-third way is to invest in environmental protection. A fifty-fourth way is to invest in environmental protection. A fifty-fifth way is to invest in environmental protection. A fifty-sixth way is to invest in environmental protection. A fifty-seventh way is to invest in environmental protection. A fifty-eighth way is to invest in environmental protection. A fifty-ninth way is to invest in environmental protection. A sixtieth way is to invest in environmental protection. A sixty-first way is to invest in environmental protection. A sixty-second way is to invest in environmental protection. A sixty-third way is to invest in environmental protection. A sixty-fourth way is to invest in environmental protection. A sixty-fifth way is to invest in environmental protection. A sixty-sixth way is to invest in environmental protection. A sixty-seventh way is to invest in environmental protection. A sixty-eighth way is to invest in environmental protection. A sixty-ninth way is to invest in environmental protection. A seventieth way is to invest in environmental protection. A seventy-first way is to invest in environmental protection. A seventy-second way is to invest in environmental protection. A seventy-third way is to invest in environmental protection. A seventy-fourth way is to invest in environmental protection. A seventy-fifth way is to invest in environmental protection. A seventy-sixth way is to invest in environmental protection. A seventy-seventh way is to invest in environmental protection. A seventy-eighth way is to invest in environmental protection. A seventy-ninth way is to invest in environmental protection. An eightieth way is to invest in environmental protection. An eighty-first way is to invest in environmental protection. An eighty-second way is to invest in environmental protection. An eighty-third way is to invest in environmental protection. An eighty-fourth way is to invest in environmental protection. An eighty-fifth way is to invest in environmental protection. An eighty-sixth way is to invest in environmental protection. An eighty-seventh way is to invest in environmental protection. An eighty-eighth way is to invest in environmental protection. An eighty-ninth way is to invest in environmental protection. A ninetieth way is to invest in environmental protection. A ninety-first way is to invest in environmental protection. A ninety-second way is to invest in environmental protection. A ninety-third way is to invest in environmental protection. A ninety-fourth way is to invest in environmental protection. A ninety-fifth way is to invest in environmental protection. A ninety-sixth way is to invest in environmental protection. A ninety-seventh way is to invest in environmental protection. A ninety-eighth way is to invest in environmental protection. A ninety-ninth way is to invest in environmental protection. A hundredth way is to invest in environmental protection.

In the United States, government has been involved in environmental regulation at least since the late 19th century, when the first federal laws were passed protecting navigable waterways. The government's role began to increase dramatically, however, around 1970. Figure 12.1 summarizes the major federal environmental laws enacted by the U.S. Congress in the modern environmental era. The nation's main pollution control agency is the **Environmental Protection Agency (EPA)**. It was created in 1970 to coordinate most of the government's efforts to protect the environment. Other government agencies involved in enforcing the nation's environmental laws include the Nuclear Regulatory Commission (NRC), the Occupational Safety and Health Administration (OSHA), and various regional, state, and local agencies.

### Major Areas of Environmental Regulation

In the United States, the federal government regulates in three major areas of environmental protection: air pollution, water pollution, and land pollution (solid and hazardous waste). This section will review the major ecological issues and the U.S. laws pertaining to each, with comparative references to similar initiatives in other nations.

#### *Air Pollution*

Air pollution occurs when more pollutants are emitted into the atmosphere than can be safely absorbed and diluted by natural processes. Some pollution occurs naturally, such as smoke and ash from volcanoes and forest fires. But most air

pollution today results from human activity, especially industrial processes and motor vehicle emissions. Air pollution degrades buildings, reduces crop yields, mars the beauty of natural landscapes, and harms people's health.

The American Lung Association (ALA) estimated in 2005 that 152 million □ Americans, more than half the population, were breathing unsafe air for at least part of each year. This number had risen more than 10 percent in the prior two years. Of particular concern to the ALA was diesel exhaust from trucks, farm and construction equipment, marine vessels, and electric generators. Fully 70 percent of the cancer risk from air pollution, it reported, was due to diesel exhaust.<sup>4</sup>

The EPA has identified six criteria pollutants, relatively common harmful substances that serve as indicators of overall levels of air pollution. These are lead, carbon monoxide, particulate matter, sulfur dioxide, nitrogen dioxide, and ozone. (Ozone at ground level is a particularly unhealthy component of smog.) In addition, the agency also has identified a list of toxic air pollutants that are considered hazardous even in relatively small concentrations. These include asbestos, benzene, chloroform, dioxin, vinyl chloride, and radioactive materials. Emissions of toxic pollutants are strictly controlled.

Failure to comply with clean air laws can be very expensive for business. In 2005, DaimlerChrysler spent \$94 million to settle government charges that it had broken environmental law by installing defective catalytic converters on nearly 1.5 million Jeep and Dodge vehicles over a 5-year period. Catalytic converters are designed to cut pollution in car and truck exhaust. The EPA ordered the company to recall and repair the faulty units, extend warranties, and set up better reporting procedures. The company was also required to pay a \$1 million fine.<sup>5</sup>

A special problem of air pollution is **acid rain**. Acid rain is formed when emissions of sulfur dioxide and nitrogen oxides, by-products of the burning of fossil fuels by utilities, manufacturers, and motor vehicles, combine with natural water vapor in the air and fall to earth as rain or snow that is more acidic than normal. Acid rain can damage the ecosystems of lakes and rivers, reduce crop yields, and degrade forests. Structures, such as buildings and monuments, are also harmed. Within North America, acid rain is most prevalent in New England and eastern Canada, regions that are downwind of coal-burning utilities in the Midwestern states.<sup>6</sup> Acid rain is especially difficult to regulate because adverse consequences often occur far—often, hundreds of miles—from the source of the pollution, sometimes across international borders. The major law governing air pollution is the Clean Air Act, passed in 1970 and most recently amended in 1990. The 1990 Clean Air Act toughened standards in a number of areas, including stricter restrictions on emissions of acid rain-causing chemicals.

The efforts of the U.S. government to reduce acid rain illustrate some of the difficult trade-offs involved in environmental policy. These are described in Exhibit 12.A.

### ***Water Pollution***

Water pollution, like air pollution, occurs when more wastes are dumped into waterways than can be naturally diluted and carried away. Water can be polluted by organic wastes (untreated sewage or manure), by the chemical by-products of industrial processes, and by the disposal of nonbiodegradable products (which do not naturally decay). Heavy metals and toxic chemicals, including some used as pesticides and herbicides, can be particularly persistent. Like poor air, poor water quality can decrease crop yields, threaten human health, and degrade the quality of life.

In 2000, more than 2,000 people in Walkerton, Ontario, a small farming community, became ill with severe diarrhea. About 1 in 10 had to be

hospitalized, and 7 people died. The mass outbreak had been caused by *E. coli* bacteria in the municipal water supply. Investigators found that manure contaminated by the dangerous bacterium had washed into a public well during a heavy rainstorm, and the water company had failed to disinfect the water as required by law. One of its managers was later convicted and served a prison term in connection with the incident.<sup>7</sup>

In the United States, regulations address both the pollution of rivers, lakes, and other surface bodies of water and the quality of the drinking water. The main U.S. law governing water pollution is the Water Pollution Control Act, also known as the Clean Water Act. This law aims to restore or maintain the integrity of all surface water in the United States. It requires permits for most *point* sources of pollution, such as industrial emissions, and mandates that local and state governments develop plans for *nonpoint* sources, such as agricultural runoff or urban storm water. The Pesticide Control Act specifically restricts the use of dangerous pesticides, which can pollute groundwater.

The quality of drinking water is regulated by another law, the Safe Drinking Water Act of 1974, most recently amended in 1996. This law sets minimum standards for various contaminants in both public water systems and aquifers that supply drinking wells.

### ***Land Pollution***

The third major focus of environmental regulation is the contamination of land by both solid and hazardous waste. The United States produces an astonishing amount of solid waste, adding up to about five pounds per person per day. Of this, 44 percent is recycled, composted, or incinerated, and the rest ends up in municipal landfills.<sup>8</sup> Many businesses and communities have tried to reduce the solid-waste stream by establishing recycling programs. The special case of recycling electronic products is described in Exhibit 12.B.

Of all the world's nations, Germany has made probably the greatest progress in reducing its solid-waste stream. In the early 1990s, faced with overflowing landfills and not enough space for new ones, the German government passed a series of strict recycling laws. Manufacturers and retailers were required to take back almost all packaging waste, from aluminum cans, to plastic CD wrappers, to cardboard shipping boxes. Packaging material was labeled with a green dot, indicating that it could be disposed of in special garbage bins, from which it would be whisked to processing centers for recycling and reuse, at the manufacturer's expense. By the mid 2000s, Germany was recycling an extraordinary 70 percent of its plastic packaging waste and had become a model for the rest of Europe.<sup>9</sup>

~~Environmental Justice~~

Some studies have suggested that hazardous-waste sites are most often located near economically disadvantaged African-American and Hispanic communities. Since 1994, EPA has investigated whether state permits for hazardous waste sites violate civil rights laws and has blocked permits that appear to discriminate against minorities. The effort to prevent inequitable exposure to risk, such as from hazardous waste, is sometimes referred to as the movement for **environmental justice**.<sup>10</sup>

A promising regulatory approach to waste management, sometimes called **source reduction**, was taken in the Pollution Prevention Act of 1990. This law aims to reduce pollution at the source, rather than treat and dispose of waste at the end of the pipe. Pollution can be prevented, for example, by using less chemically intensive manufacturing processes, recycling, and better housekeeping and maintenance. Source reduction often saves money, protects worker health, and requires less abatement and disposal technology. The law provides guidelines, training, and incentives for companies to reduce waste.

The major U.S. law governing the cleanup of existing hazardous-waste sites is the Comprehensive Environmental Response, Compensation, and Liability Act, or **CERCLA**, popularly known as **Superfund**, passed in 1980. This law established a fund, supported primarily by a tax on petroleum and chemical companies that were presumed to have created a disproportionate share of toxic wastes. EPA was charged with establishing a National Priority List of the most dangerous toxic sites. Where the original polluters could be identified, they would be required to pay for the cleanup; where they could not be identified or had gone out of business, the Superfund would pay.

An example of a hazardous waste site on EPA's list is the Brio Superfund site, two former waste disposal plants located near the Southbend subdivision outside Houston, Texas. Local wells have been polluted by dangerous chemicals such as xylene, and a black tarlike substance has bubbled into driveways and garages. Air pollution is suspected as a possible cause of a rash of birth defects, and children have contracted leukemia and other serious illnesses. The once-thriving community of 2,800 is largely boarded up, and although progress has been made, the cleanup has still not been completed.<sup>11</sup>

Remarkably, one in four U.S. residents now lives within four miles of a Superfund site. The 1,200 or so sites originally placed on the National Priority List may be just the tip of the iceberg. Congressional researchers have said that as many as 10,000 other sites may need to be cleaned up.

~~And Superfund will be depleted for cleanup of about 20,000 identified sites of hazardous waste sites. The Superfund program was established in 1980 to pay for the cleanup of hazardous waste sites. The Superfund program was established in 1980 to pay for the cleanup of hazardous waste sites.~~

## Alternative Policy Approaches

Governments can use a variety of policy approaches to control air, water, and land pollution. The most widely used method of regulation historically has been to impose environmental standards. Increasingly, however, government policy makers have relied more on market-based and voluntary approaches, rather than command and control regulations, to achieve environmental goals.

### *Environmental Standards*

The traditional method of pollution control is through **environmental standards**. - Standard allowable levels of various pollutants are established by legislation or regulatory action and applied by administrative agencies and courts. This approach is also called **command and control regulation**, because the government commands business firms to comply with certain standards and often directly controls their choice of technology.

One type of standard is an *environmental-quality standard*. In this approach a given geographical area is permitted to have no more than a certain amount or proportion of a pollutant, such as sulfur dioxide, in the air. Polluters are required to control their emissions to maintain the area's standard of air quality. A second type is an *emission standard*. For example, the law might specify that manufacturers could release into the air no more than 1 percent of the ash (a pollutant) they generated. Emission standards, with some exceptions, are usually set by state and local regulators who are familiar with local industry and special problems caused by local topography and weather conditions. Sometimes, EPA mandates that companies use the *best available technology*, meaning a particular process that the agency determines is the best economically achievable way to reduce negative impacts on the environment.

In recent years, EPA has given companies more flexibility in how they meet government standards, so long as they achieve certain overall goals. For

example, under an initiative called Project XL, EPA negotiated an agreement with Intel covering the company's huge semiconductor chip-making factory in Chandler, Arizona. Intel agreed to cap overall air pollution at a level below existing EPA limits and to recycle much of the water used and nonhazardous waste generated at the plant. It also agreed to monitor its own emissions on an ongoing basis and to report complete and current information on the Internet as well as with the government. In exchange, EPA gave the company a facilitywide permit and wide latitude on the technologies and processes it used to meet these goals.<sup>12</sup>

### ***Market-Based Mechanisms***

In recent years, regulators have begun to move away from command and control regulation, favoring increased use of **market-based mechanisms**. This approach is based on the idea that the market is a better control than extensive standards that specify precisely what companies must do.

One approach that has become more widely used is to allow businesses to buy and sell the right to pollute. The European Union's *tradable permit* program for carbon emissions, described in one of the opening examples of this chapter, illustrates this approach. The U.S. Clean Air Act of 1990 also incorporated the concept of tradable permits as part of its approach to pollution reduction. The law established emission levels and permitted companies that achieved emissions below the standard to sell their rights to the remaining permissible amount to firms that faced penalties because their emissions were above the standard. Over time, the government would reduce permissible emission levels. The system would therefore gradually reduce overall emissions, even though individual companies might continue to pollute above the standard. Companies could choose whether to reduce their emissions—for example, by installing pollution abatement - equipment—or to buy allowances from others. One study showed that the tradable permit program for acid rain may have saved companies as much as \$3 billion per year, by allowing them the flexibility to choose the most cost-effective methods of complying with the law.<sup>13</sup>

Another market-based type of pollution control is establishment of *emissions charges* or *fees*. Each business is charged for the undesirable waste that it emits, with the fee varying according to the amount of waste released. The result is, "The more you pollute, the more you pay." In this approach, polluting is not illegal, but it is expensive, creating an incentive for companies to clean up. In recent years, both federal and state governments have experimented with a variety of so-called *green taxes* or *eco-taxes* that levy a fee on various kinds of environmentally destructive behavior. In addition to taxing bad behavior, the government may also offer various types of positive incentives to firms that improve their environmental performance. For example, the government may decide to purchase only from those firms that meet a certain pollution standard, or it may offer aid to those that install pollution control equipment. Tax

incentives, such as faster depreciation for pollution control equipment, also may be used.

In the United Kingdom, environmental activists proposed an eco-tax on airfares. Under the plan, passengers would pay a special tax, based on the number of miles they flew; the proceeds would go to programs to undo the environmental damage caused by airplanes. The main purpose of the tax was to discourage people from flying, particularly on short routes, and to take less polluting trains instead. Predictably, the aviation and tourism industries opposed the proposal. But in a poll of readers conducted by a British newspaper, three-quarters said they would be willing to pay such an eco-tax. Said one reader, "I think air travel is very damaging to the environment, and growth must be restricted."<sup>14</sup>

In short, in the 2000s the trend was to use more flexible, market-oriented approaches—tradable allowances, pollution fees and taxes, and incentives—to achieve environmental objectives where possible.

### ***Information Disclosure***

Another approach to reducing pollution is popularly known as *regulation by publicity*, or *regulation by embarrassment*. The government encourages companies to pollute less by publishing information about the amount of pollutants individual companies emit each year. In many cases, companies voluntarily reduce their emissions to avoid public embarrassment.

The major experiment in regulation by publicity has occurred in the area of toxic emissions to the air and water. The 1986 amendments to the Superfund law, called SARA, included a provision called the Community Right-to-Know Law, which required manufacturing firms to report, for about 300 toxic chemicals, the amount on site, the number of pounds released, and how (if at all) these chemicals were treated or disposed of. EPA makes this information available to the public in the *Toxics Release Inventory*, or *TRI*, published annually and posted on the Internet.

From 1988 to 2002, reporting manufacturers in the United States cut their releases of these chemicals to the air by 42 percent and into water by 32 percent, according to TRI data (releases to land increased during this period).<sup>15</sup> Some of the biggest cuts were made by the worst polluters. These dramatic results were especially surprising to regulators, because many of the hazardous chemicals were not covered under clean air and water regulations at the time. The improvements, in many instances, had been completely voluntary. Apparently, fear of negative publicity had compelled many companies to act. "We knew the numbers were high, and we knew the public wasn't going to like it," one chemical industry executive explained. In 2005, EPA proposed to change reporting requirements for companies from every year to every other year and to allow companies to emit 5,000 pounds of a particular chemical (up from 500 pounds) before they were required to file a report.<sup>16</sup>

The advantages and disadvantages of alternative policy approaches to reducing pollution are summarized in Figure 12.2.

### ***Civil and Criminal Enforcement***

Companies that violate environmental laws are subject to stiff civil penalties and fines, and their managers can face prison if they knowingly or negligently endanger people or the environment. Proponents of this approach argue that the threat of fines and even imprisonment can be an effective deterrent to corporate outlaws who would otherwise degrade the air, water, or land. Since 1989, about 100

individuals and companies have been found guilty of environmental crimes each year.

For example, in 2005 Motiva Enterprises paid \$24 million to settle charges stemming from a massive explosion at its Delaware City refinery that had killed one worker, injured several others, and sent a massive plume of sulfuric acid into the surrounding community. Investigators found that workers had complained about the corroded tank for years, but the company had delayed taking it out of service. The Delaware attorney general also filed charges of negligent homicide against the company.<sup>17</sup>

European regulators and prosecutors have also actively pursued corporate environmental criminals. For example, the EU recently standardized its laws against marine pollution and raised maximum penalties to \$1.8 million after a series of oil tanker wrecks fouled the coasts of France, Spain, and Portugal.<sup>18</sup>

The U.S. Sentencing Commission, a government agency responsible for setting uniform penalties for violations of federal law, has established guidelines for sentencing environmental wrongdoers. Under these rules, penalties would reflect not only the severity of the offense but also a company's demonstrated environmental commitment. Businesses that have an active compliance program, cooperate with government investigators, and promptly assist any victims would receive lighter sentences than others with no environmental programs or that knowingly violate the law. These guidelines provide an incentive for businesses to develop active compliance programs to protect themselves and their officers from high fines or even prison if a violation should occur.<sup>19</sup>

## Costs and Benefits of Environmental Regulation

One central issue of environmental protection is how costs are balanced by benefits. In the quarter century or so since the modern environmental era began, the nation has spent a great deal to clean up the environment and keep it clean. Some have questioned the value choices underlying these expenditures, suggesting that the costs—lost jobs, reduced capital investment, and lowered productivity—exceeded the benefits. Others, in contrast, point to significant gains in the quality of life and to the economic payoff of a cleaner environment.

As a nation, the United States has invested heavily in environmental cleanup. According to the EPA, by 1990 environmental spending exceeded \$100 billion a year, but 2 percent of the nation's gross national product, and reached \$160 billion annually by 2000. Business spending to comply with environmental regulation has diverted funds that might otherwise have been invested in new plants and equipment or in research and development. Sometimes, strict rules have led to plant shutdowns and loss of jobs. Some regions and industries, in particular, have been hard hit by environmental regulation, especially those with high abatement costs, such as paper and wood products, chemicals, petroleum and coal, and primary metals. Economists often find it difficult, however, to sort out what proportion of job loss in an industry is attributable to environmental regulation and what proportion is attributable to other causes.



In many areas, the United States has made great progress in cleaning up the environment. The benefits of this progress have often been greater than the costs, as these figures show:

- Although problems remain, as noted earlier in this chapter, overall emissions of nearly all major air pollutants in the United States have dropped substantially since 1990, the date of the Clean Air Act amendments. During the decade after the law passed, for example, levels of volatile organic compounds dropped by 27 percent, nitrous oxides by 26 percent, and sulfur dioxide by 25 percent. A study done for the EPA showed that by the year 2010, the Clean Air Act amendments will have prevented 23,000 premature deaths from air pollution, averted almost 2 million asthma attacks, and prevented 4 million lost workdays, among other gains. The cost of compliance was estimated at \$27 billion, about one-fourth of the economic value of the act's benefits.<sup>20</sup>
- Water quality has also improved. Since the Water Pollution Control Act went into effect in 1972, many lakes and waterways have been restored to ecological health. The Cuyahoga River in Ohio, for example, which at one time was so badly polluted by industrial waste that it actually caught on fire, has been restored to the point where residents can fish and even swim in the river. By one estimate, 33,000 more miles of rivers and streams were swimmable in 2000 than would have been the case without the Clean Water Act.<sup>21</sup> The cumulative cost to industry and the public of compliance with the act was estimated at \$14 billion in 1997; this was much less than the estimated benefits of clean water of \$11 billion a year.<sup>22</sup>

Environmental regulations also stimulate some sectors of the economy. The environmental services and products industry, for example, has grown dramatically. While jobs are being lost in industries such as forest products and high-sulfur coal mining, others are being created in areas like recycling and reuse, environmental consulting, instrument manufacturing, waste management equipment, and air pollution control.<sup>23</sup> Other jobs are saved or created in industries such as fishing and tourism when natural areas are protected or restored. Moreover, environmental regulations can stimulate the economy by compelling businesses to become more efficient by conserving energy, and less money is spent on treating health problems caused by pollution.

Because of the complexity of these issues, economists differ on the net costs and benefits of environmental regulation. In some respects, government controls hurt the economy, and in other ways they help, as summarized in Figure 12.3. An analysis of data from several studies found that, on balance, U.S. environmental regulations did not have a large overall effect on economic competitiveness because losses in one area tended to balance gains in another.<sup>24</sup> What is clear is that choices in the area of environmental regulation reflect underlying values, expressed in a democratic society through an open political process. Just how much a society is prepared to pay and how "clean" it wants to be are political choices, reflecting the give and take of diverse interests in a pluralistic society.

## The Greening of Management

Environmental regulations, such as the laws governing clean air, water, and land described in this chapter, establish minimum legal standards that businesses must meet. Most companies try to comply with these regulations, if only to avoid litigation, fines, and, in the most extreme cases, criminal penalties. But many firms are now voluntarily moving beyond compliance to improve their environmental performance in all areas of their operations. Researchers have sometimes referred to the process of moving toward more proactive environmental management as the **greening of management**. This section describes the stages of the greening process and discusses what organizational approaches companies have used to manage environmental issues effectively. The following section explains why green management can improve a company's strategic competitiveness.

### **Stages of Corporate Environmental Responsibility**

Although environmental issues are forcing all businesses to manage in new ways, not all companies are equally green, meaning proactive in their response to environmental issues. One widely used model identifies three main stages of corporate environmental responsibility.

According to this model, companies pass through three distinct stages in the development of green management practices.<sup>25</sup> The first stage is *pollution prevention*, which focuses on "minimizing or eliminating waste before it is created." For example, Dow Chemical Corporation has adopted a wide-ranging program called Waste Reduction Always Pays, WRAP for short. Realizing that it would be more efficient and less expensive to prevent pollution in the first place than to treat and dispose of pollutants at the "end of the pipe," the company has radically cut the use of hazardous chemicals in its manufacturing processes, saving over \$20 million a year.<sup>26</sup> The second stage is *product stewardship*. In this stage, managers focus on "all environmental impacts associated with the full life cycle of a product," from the design of a product to its eventual use and disposal. Hewlett-Packard, mentioned earlier in this chapter, is an example of a company at this stage. Finally, the third and most advanced stage is *clean technology*, in which businesses develop innovative, new technologies that support sustainability.

General Electric, a company long associated with pollution, from building coal-fired power plants to dumping toxic chemicals in the Hudson River, took a dramatic turn in 2005. Jeffrey Immelt, the company's new CEO, announced a new strategy he dubbed "ecomagination." He pledged to double GE's investment by 2010 (from \$700 million to \$1.5 billion) in developing renewable energy, fuel cells, efficient lighting, water filtration systems, and cleaner jet engines. Immelt's reason was that clean technologies represented

a huge commercial opportunity. “Increasingly for business,” he said, “green is green.”<sup>27</sup>

Where are most companies on this continuum of environmental responsibility? A survey of 140 large U.S. firms conducted by the accounting firm PricewaterhouseCoopers found that 75 percent had adopted at least some environmental initiatives. Most of these, however, were efforts to prevent pollution. Almost 9 out of 10, though, thought that corporate commitment to sustainability would grow over the next five years.<sup>28</sup> In short, most big companies are still in the pollution prevention stage, but many are in a transition to higher stages in the developmental sequence.

Researchers have discovered that several factors push companies along the continuum from lower to higher levels of corporate environmental responsiveness. One study of firms in the United Kingdom and Japan found three main motivations for “going green”: the chance to gain a *competitive advantage*, a desire to gain *legitimacy* (approval of the public or regulators), and a moral commitment to *ecological responsibility*.<sup>29</sup> Other research has cited a desire to avoid the risks associated with environmental harm.

### **The Ecologically Sustainable Organization**

An **ecologically sustainable organization (ESO)** is a business that operates in a way that is consistent with the principle of sustainable development, as presented in Chapter 11. In other words, an ESO could continue its activities indefinitely, without altering the carrying capacity of the earth’s ecosystem. Such businesses would not use up natural resources any faster than they could be replenished or substitutes found. They would make and transport products efficiently, with minimal use of energy. They would design products that would last a long time and that, when worn out, could be disassembled and recycled. They would not produce waste any faster than natural systems could absorb and disperse it. They would work with other businesses, governments, and organizations to meet these goals.<sup>30</sup>

Of course, no existing business completely fits the definition of an ecologically sustainable organization. The concept is what social scientists call an ideal type, that is, a kind of absolute standard against which real organizations can be measured. A few visionary businesses, however, have embraced the concept and begun to try to live up to this ideal.

One such business is Interface, a \$1 billion company based in Atlanta, Georgia, that makes 40 percent of the world’s commercial carpet tiles. In 1994, CEO Ray C. Anderson announced, to many people’s surprise, that Interface would seek to become “the first sustainable corporation in the world.” Anderson and his managers undertook hundreds of initiatives. For example, the company started a program by which customers could *lease*, rather than *purchase*, carpet tile. When tile wore out in high-traffic areas, Interface technicians would replace just the worn units, reducing waste. Old tiles would be recycled, creating a closed loop. In 2004, Interface reported that in 10 years it had saved \$262 million by cutting waste, and revenues and profits had soared. But Anderson said it was “just a start. It’s daunting, trying to climb a mountain taller than Everest.”<sup>31</sup>

No companies, including Interface, have yet become truly sustainable businesses, and it will probably be impossible for any single firm to become an ESO in the absence of supportive government policies and a widespread movement among many businesses and other social institutions.

### Environmental Partnerships

Many businesses that are seeking to become more sustainable have formed voluntary, collaborative partnerships with environmental organizations and regulators to achieve specific objectives, as illustrated by the FedEx example at the beginning of this chapter. These collaborations, called **environmental partnerships**, draw on the unique strengths of the different partners to improve environmental quality or conserve resources.<sup>32</sup>

Unilever, the Anglo-Dutch consumer goods company, is the largest buyer of seafood in the world. Concerned about the rapidly declining stocks of many species of fish used in its frozen food products, Unilever entered into a partnership with the World Wildlife Fund, a conservation organization. Together, they formed the nonprofit Marine Stewardship Council to set standards for sustainable fisheries, educate suppliers, and certify harvested catch. In 2005, Unilever began marketing frozen fish sticks sourced from the newly certified Alaskan pollock fishery. “This certification is very good news for the protection of fish stocks in general, and good news for the ever-increasing number of discerning consumers who want to choose sustainable fish for their families,” said one of the company’s managers.<sup>33</sup>

### Environmental Management in Practice

Companies that have begun to move toward environmental sustainability have learned that new structures, processes, and incentives are often needed. Some of the organizational elements that many proactive green companies share are the following.<sup>34</sup>

**Top-level commitment** Environmental responsibility is most effective when it is supported by the top management of the company. For this reason, many green companies involve senior managers and workers directly in the process of change. At the Pak Plaza Hotel in Boston, guests and employees make suggestions ranging from energy-efficient windows to the use of paper and lamp.

**Codes of environmental conduct** Environmentally proactive companies put the commitment in writing. In the form of a code of conduct or a policy, the firm’s environmental goals are clearly stated. For example, a European company has a policy that requires its employees to turn off their computers and monitors when they are not in use. Another company has a policy that requires its employees to turn off their computers and monitors when they are not in use.

**Cost incentives** Another organization makes use of financial incentives to encourage its employees to take action. These incentives are given to employees who suggest ideas that save the company money. For example, a company in California has a Pollution Prevention Committee that is representative of all of the major businesses within the company. Each year the committee sets a budget for pollution prevention and encourages employees to submit proposals for cost-effective pollution prevention projects such as recycling and water conservation.

**Reward incentives** Businesspeople are likely to consider environmental impacts of their actions when their organizations acknowledge and reward their efforts. For example, a company might give an employee a bonus for suggesting an idea that saves the company money or for suggesting an idea that improves the company’s environmental performance.

### Environmental Audits

Green companies not only organize themselves to achieve environmental goals; they also closely track their progress toward meeting them. Chapter 4 introduced the concept of social performance auditing and presented recent evidence on what proportion of companies report results to their stakeholders. In the 1990s, in a parallel development, many companies began to audit their environmental performance. In the mid-2000s, in a significant change in practice, many firms moved to integrate their social, environmental, and economic reporting into a single **sustainability report**. In 2005, 68 percent of the world's top 250 companies issued such an integrated report, up from just 14 percent in 2002.

An example of a company that made such a shift is Toyota, which issued its first environmental report in 1998; since 2003, the company has moved to integrated sustainability reporting. Its reports present detailed data on the company's progress in meeting stated past and future goals. "In the future, Toyota plans to continue enhancing disclosure of information [on] both the environmental and social aspects of its activities," said the company's executive vice president.<sup>36</sup>

As discussed in Chapter 4, the movement toward integrated social and environmental performance reporting is a worldwide phenomenon.

## Environmental Management as a Competitive Advantage

Some researchers believe that by moving toward ecological sustainability, business firms gain a competitive advantage. That is, relative to other firms in the same industry, companies that proactively manage environmental issues will tend to be more successful than those that do not.<sup>37</sup> One top business executive who has embraced this view is William Clay Ford, chairman of the Ford Motor Company. Under his leadership, the company undertook development of efficient hybrid gasoline-electric vehicles, set out to remodel its venerable Rouge factory complex as a state-of-the-art environmental facility, and joined a partnership to develop hydrogen fuel cells—a new kind of engine based on a totally renewable energy source. Said Ford, "We can't expand in potentially huge markets such as India and China, and provide a better life for the world's poorest people, unless we can do it in a sustainable way. . . . We look at [sustainability] not just as a requirement, but as an incredible opportunity."<sup>38</sup>

Effective environmental management confers a competitive advantage in four different ways, as follows.

### Cost Savings

Companies that reduce pollution and hazardous waste, reuse or recycle materials, and operate with greater energy efficiency can reap significant cost savings. An example is Herman Miller, the office furniture company.

Herman Miller goes to great lengths to avoid wasting materials. The company sells fabric scraps to the auto industry for use as car linings; leather trim to luggage makers for attaché cases; and vinyl to the supplier to be re-extruded into new edging. Burnable solid waste is used as fuel for a specialized boiler that generates all the heating and cooling for the company's main complex in Zeeland, Michigan. The result is that the company actually makes money from materials that, in the past, it would have had to pay to have hauled away and dumped.<sup>39</sup>

### Product Differentiation

Companies that differentiate their products through environmental friendliness can gain a competitive advantage. For example, Patagonia, a clothing company, has built a reputation for using recycled materials in its products. This has helped the company to attract environmentally conscious consumers and to differentiate itself from its competitors.

### Technological Innovation

Environmentally proactive companies are often technological leaders, as they seek imaginative new methods for reducing pollution and increasing efficiency. In many cases, they produce innovations that can win new customers, penetrate new markets, or even be marketed to other firms as new regulations spur their adoption.

Nikon, a Japanese firm that makes cameras and other optical products, became concerned about use of environmentally harmful materials in the production of optical glass. The company invested several years of effort and millions of yen to develop a new product, dubbed “eco-glass,” that equaled the performance of other optical glass but was made entirely without lead or arsenic. By 2005, Nikon had switched to eco-glass in all the consumer products it shipped. The company’s innovation attracted customers such as environmentally aware birdwatchers who were impressed with eco-glass binoculars.<sup>41</sup>

In Europe, new rules that went into effect in 2006 banned all electronics products that included six toxic substances, including lead, cadmium, and mercury. Companies that had learned how to make their products free of these substances suddenly had a big advantage in winning European accounts.<sup>42</sup>

### **Strategic Planning**

Companies that cultivate a vision of sustainability must adopt sophisticated strategic planning techniques to allow their top managers to assess the full range of the firm’s effects on the environment. The complex auditing and forecasting techniques used by these firms help them anticipate a wide range of external influences on the firm, not just ecological influences. Wide-angle planning helps these companies foresee new markets, materials, technologies, and products.

Since 2005, the Global 100 Most Sustainable Corporations in the World have been announced annually at the World Economic Forum in Davos, Switzerland. The winners are selected based on their “ability to manage strategic opportunities in new environmental and social markets.” On the list in both 2005 and 2006 was BP, formerly British Petroleum. As one of the world’s leading producers of oil and gas, BP clearly contributes to global warming and other environmental ills. Nonetheless, the company was cited for investing in solar, fuel cell, and wind power technologies; introducing low-emissions fuels at its retail outlets; and entering cross-industry sustainability partnerships. In 2006, the company announced the formation of a new business unit, BP Alternative Energy, and said it anticipated sales of \$6 billion annually within a decade. BP’s environmental initiatives were consistent with long-range strategic planning that anticipated an eventual decline in the world’s supply of fossil fuels, a rising threat of climate change, and a tighter regulatory environment.<sup>43</sup>

In short, proactive environmental management may help businesses not only promote sustainability but also become more competitive in the global marketplace by reducing costs, attracting environmentally aware customers, spurring innovation, and encouraging long-range strategic planning that anticipates external change.<sup>44</sup>

- Government environmental regulations focus on protecting the ecological health of the air, water, and land. Environmental laws are designed to limit the amount of pollution that companies may emit.

- **Environmental laws have traditionally been of the command and control type, specifying standards and results.**

results. New laws, in both the United States and Europe, have added market incentives to induce environmentally sound behavior and have encouraged companies to reduce pollution at the source.

- Environmental laws have brought many benefits. Air, water, and land pollution levels are in many cases lower than in 1970. But some improvements have come at a high cost. A continuing challenge is to find ways to promote a clean environment and sustainable business practices without impairing the competitiveness of the U.S. economy.
- Companies pass through three distinct stages in the development of green management practices. Many businesses are now moving from lower to higher stages. An ecologically sustainable organization is one that operates in a way that is consistent with the principle of sustainable development.
- Effective environmental management requires an integrated approach that involves all parts of the business organization, including top leadership, line managers, and production teams, as well as strong partnerships with stakeholders and effective auditing.
- Many companies have found that proactive environmental management can confer a competitive advantage by saving money, attracting green customers, promoting innovation, and developing skills in strategic planning.

### **Discussion Case: *Digging Gold***

Gold mining is one of the most environmentally destructive industries in the world. Most gold today is extracted using a technique called cyanide heap-leaching.

Workers dig and blast the earth in open-pit mines so massive that astronauts can see them from space. Using huge earth-moving machines, they pile the gold-bearing ore into mounds the size of pyramids, then spray them with a solution of cyanide to leach out the gold. In a series of steps, gold is then removed from the drainage at the bottom of the heap and is further refined in smelters into pure bars of the precious metal.

Heap-leaching enables the economic extraction of gold from low-grade ores; some modern mines use as much as 30 tons of rock to produce a single ounce of precious metal. But this process can be highly damaging to the environment. Cyanide is one of the most potent poisons known; a pellet the size of a grain of rice can kill a person. Most spent cyanide solution is stored in reservoirs, where it gradually breaks down. But these reservoirs are prone to accidents. In 2000, at a gold mine in Romania operated by the Australian firm Esmeralda Exploration, 100,000 tons of wastewater laced with cyanide spilled into a tributary of the Danube River. The toxic plume washed all the way to the Black Sea, causing a massive kill of fish and birds and contaminating the drinking water of 2.5 million people.

After this incident, a Romanian citizen's group called Alburnus Maior organized to block construction of a new gold mine by the Canadian firm Gabriel Resources at Rosia Montana. "We have to decide whether we want [these] mountains to become a no man's land," said Eugen David, a local farmer and activist.

Transportation of materials to and from mines, which are often located in remote areas, poses additional risks. A truck carrying containers of mercury (a by-product of gold extraction) from the Yanacocha Mine in Peru, owned by U.S.-based Newmont Mining, spilled its load on a rural road. Villagers from the area, not understanding the danger, collected the hazardous liquid metal. More than 1,000 people became ill, some permanently, a lawsuit later filed on their behalf charged.

In most developed nations, environmental laws prohibit the discharge of mining waste directly into waterways. But elsewhere in the world, laws are often weaker and regulations poorly enforced. In Indonesia, U.S.-based Freeport McMoran's Grasberg operation, the largest gold mine in the world, dumps its waste directly into local rivers, badly damaging downstream rain forests and wetlands. An official of the Environment Ministry said that the agency's regulatory tools were so weak that it was like "painting on clouds" to get the company even to follow the law.

Gold mining also pollutes the air. The entire process of metal extraction—from diesel-powered earth-moving equipment to oil- and coal-burning smelters—consumes large quantities of fuel, contributing to global warming. Smelters produce oxides of nitrogen and sulfur, components of acid rain, as well as traces of toxic metals such as lead, arsenic, and cadmium.

Another environmental hazard of gold extraction is acid mine drainage. Often, the rock that harbors gold also contains sulfide minerals. When this rock is crushed and exposed to air and water, these minerals form sulfuric acid. As this acid drains from mine debris, it picks up other metals, such as arsenic, mercury, and lead, creating a toxic brew that can drain into groundwater and waterways. This process can go on for decades, long after a mine has shut down.

In the United States, although mining companies have to follow environmental laws, no law specifically ensures that a mine will not create acid runoff. Sixty-three Superfund sites are abandoned mines; the EPA has estimated their cleanup cost at \$7.8 billion. In a study for Congress in 2005, the General Accounting Office called for new rules to require mining companies to post adequate surety bonds (a kind of insurance) to cover the costs of remediation if they went out of business.

Pegasus Gold, a Canadian company, declared bankruptcy in 1998 and abruptly shut down its Zortman-Landusky mine in Montana, once the largest gold mine in the United States, sticking the state's taxpayers with a \$33 million bill for ongoing water treatment and cleanup. The citizens of Montana subsequently voted to ban cyanide heap-leach mining completely anywhere in the state. After an effort to overturn this initiative failed, Canyon Resources, a company that held the rights to



a valuable Montana deposit, said it was looking into other ways to extract gold, including an innovative new technology that used bacteria instead of cyanide.

In 2004, Earthworks, an environmental NGO based in the United States, launched a campaign called “No Dirty Gold,” picketing stores on Fifth Avenue in Manhattan and calling on consumers to boycott gold jewelry. At least one retailer was listening. Michael Kowalski, chairman of the jewelry retailer Tiffany & Co., announced that his company would fund an independent study to define environmentally sound mining practices. Tiffany had already committed to sourcing its gold from Bingham Canyon, a mine in Utah operated by Kennecott, a company that had made a public commitment to sustainability. “For Tiffany, responsible mining is absolutely a part of our brand contract,” Kowalski said.

**Sources:** “Dirty Metals: Mining, Communities, and the Environment,” a Report by Earthworks and Oxfam America, 2004, [www.nodirtygold.org](http://www.nodirtygold.org); “Beyond Gold’s Glitter: Torn Lands and Pointed Questions,” *New York Times*, October 24, 2005, pp. A1, A10; “Tangled Strands in Fight over Peru Gold Mine,” *New York Times*, October 25, 2005, pp. A1, A14; “Hardrock Mining: BLM Needs to Better Manage Financial Assurances to Guarantee Reclamation Costs,” GAO Report to the Ranking Minority Member, Committee on Homeland Security and Governmental Affairs, U.S. Senate, June 2005; Jared Diamond, *Collapse: How Societies Choose to Fail or Succeed* (New York: Viking, 2005), Ch. 15, “Big Business and the Environment: Different Conditions, Different Outcomes”; “Tiffany & Co.: A Case Study in Diamonds and Social Responsibility,” *Business Ethics* (Wharton), November 17, 2004, <http://knowledge.wharton.upenn.edu>; Web sites of Westerners for Responsible Mining, [www.bettermines.org](http://www.bettermines.org), and Alburnus Maior, [www.rosiamontana.org](http://www.rosiamontana.org); and additional articles in the Northwest Mining Association Bulletin, High Country News, and Billings Gazette. Kennecott’s sustainable development reports are available at <http://kennecott.com>.

1. Using the classification system presented in the chapter section, “Major Areas of Environmental Regulation,” what types of pollution are generated by gold mining? Which of these do you think is (are) most damaging to the environment, and why?
2. Using the classification system presented in the section, “Alternative Policy Approaches,” what types of government regulation do you think would most effectively address the concerns you have identified?
3. In your view, what role should nongovernmental organizations (NGOs) and citizen movements play in reducing the adverse environmental impacts of gold mining?
4. Which impacts are the most serious? Why?

<sup>1</sup> Lynelle Preston, “Sustainability at Hewlett-Packard: From Theory to Practice,” *California Management Review* 43, no. 3 (Spring 2001), pp. 26–37. Hewlett-Packard’s annual Global Citizenship Report, including information on its environmental initiatives, is available at [www.hp.com/hpinfo/globalcitizenship/environment](http://www.hp.com/hpinfo/globalcitizenship/environment).

<sup>2</sup> “New Limits on Pollution Herald Change in Europe,” *International Herald Tribune*, January 1, 2005. Information about the EU Emissions Trading Scheme is available at [www.euractiv.com](http://www.euractiv.com).

<sup>3</sup> “FedEx, Environmental Defense Delivering Clean Air,” [www.environmentaldefense.org](http://www.environmentaldefense.org).

<sup>4</sup> American Lung Association, “State of the Air: 2005,” [www.lungusa.org/reports/sota05](http://www.lungusa.org/reports/sota05); and “Closing the Diesel Divide: Protecting Public Health from Diesel Air Pollution,” Environmental Defense Fund and the American Lung Association, 2003, [www.environmentaldefense.org](http://www.environmentaldefense.org).

## FIGURE 12.1

### Leading U.S. Environmental Protection Laws

As part of its efforts to control acid rain, the U.S. government in 1990 initiated stricter new restrictions on the emission of sulfur dioxide by utilities. Many electric companies complied with the law by switching from high-sulfur coal, which produces more sulfur dioxide when burned, to low-sulfur coal, which produces less. This action had the beneficial effect of reducing acid rain.

But the law had some environmentally destructive results that had been unintended by regulators. Much of the highest-quality low-sulfur coal in the United States lies in horizontal layers near the tops of rugged mountains in Appalachia, including parts of West Virginia, Kentucky, Tennessee, and Virginia. Some coal companies discovered that the cheapest way to extract this coal was through what came to be known as mountaintop removal. Explosives were used to blast away up to 100 feet of rock and soil. Each, were then used to remove the debris to get at buried seams of coal. By the mid-2000s, 400,000 acres had been ravaged in this manner by surface mining.

Although coal operators were required to reclaim the land afterward—by filling in adjacent valleys with debris and planting grass and shrubs—many environmentalists believed the damage caused by mountaintop removal was severe. Many rivers and creeks were contaminated and habitat destroyed. Aquifers dried up, and the entire region became

vulnerable to devastating floods. Many felt it was deeply ironic that a law that had benefited the environment in one way had indirectly harmed it in another.

**Source:** “The High Cost of Cheap Coal: When Mountains Move,” *National Geographic*, March 2006, pp. 105–23.

<sup>5</sup> “U.S. Announces \$94 Million Clean Air Settlement with Chrysler over Emission Control Defects on 1.5 Million Jeep and Dodge Vehicles,” U.S. Environmental Protection Agency Press Release, December 21, 2005.

<sup>6</sup> More information about acid rain may be found at [www.epa.gov/airmarkets/acidrain](http://www.epa.gov/airmarkets/acidrain).

Part Five *The Corporation and the Natural Environment*

<sup>7</sup> “Waterworks Manager Jailed,” *Montreal Gazette*, December 21, 2004, p. A12; and “Few Left Untouched after Deadly E. Coli Flows through an Ontario Town’s Water,” *The New York Times*, July 10, 2000, p. A8.

<sup>8</sup> Environmental Protection Agency, “Municipal Solid Waste,” available at [www.epa.gov/garbage](http://www.epa.gov/garbage).

What happens to old personal computers (PCs), cell phones, televisions, and other electronic equipment when they are no longer wanted? The dimensions of the problem are huge. In the United States alone, around 100 million PCs, monitors, and televisions become obsolete every year, and this number is growing. Discarded electronic equipment, sometimes called e-waste, now makes up 5 percent of the trash dumped in municipal landfills, according to EPA. This is a problem because e-waste is not only bulky, but is also loaded with toxic metals like lead, zinc, mercury, and cadmium. Is recycling the answer? Potentially, yes. Unfortunately, as much as 80 percent of recycled e-waste from the United States is shipped overseas to China, India, Pakistan, and the Philippines. There, workers who disassemble it to recover valuable metals are exposed to a veritable “witch’s brew of chemicals,” according to a journalistic investigation. In response, some forward-looking companies are taking action. Dell and IBM both take back used equipment for a small fee. Sony, Panasonic, and Toshiba now offer lead-free monitors. After an internal investigation showed that “a lot of the leftover guts” of its machines were being sent to China, Hewlett-Packard opened its own facilities in California and Tennessee where it works to safely recycle obsolete equipment. “We don’t hurt the environment or the people in any place our products are made, used, or disposed of,” said the company’s product recycling manager. “It’s not good for the bottom line, and it’s not good for HP’s image.”

**Sources:** Government Accounting Office, “Electronic Waste: Strengthening the Role of the Federal Government in Encouraging Recycling and Reuse,” November 2005; Silicon Valley Toxics Coalition and Basel Action Network, “Exporting Harm: The High-Tech Trashing of Asia,” February 25, 2002, [www.svtc.org](http://www.svtc.org); and *San Jose Mercury News*, “Where Computers Go to Die” (three part series), November 24, 25, and 26, 2002. Comparative international statistics are available at [www.e-waste.ch/facts\\_and\\_figures/economics/quantities](http://www.e-waste.ch/facts_and_figures/economics/quantities). Information on HP’s program is available at [www.hp.com/recycle](http://www.hp.com/recycle).

<sup>9</sup> “EU Implements Tough New Laws That Will Increase Recycling by 100%,” August 18, 2005, Environmental News Service, [www.ens-newswire.com](http://www.ens-newswire.com).

<sup>10</sup> Robert D. Bullard, “Environmental Justice in the 21st Century,” Environmental Justice Resource Center, available at [www.ejrc.cau.edu/ejinthe21century.htm](http://www.ejrc.cau.edu/ejinthe21century.htm); Christopher H. Foreman, Jr., *The Promise and Perils of Environmental Justice* (Washington, DC: Brookings Institution, 2000); and Bunyan Bryant, ed., *Environmental Justice: Issues, Policies, and Solutions* (Washington, DC: Island Press, 1995).

<sup>11</sup> Data on the current status of the cleanup of this and other Superfund sites may be found at [www.epa.gov/superfund](http://www.epa.gov/superfund).

<sup>12</sup> Further information is available at [www.epa.gov/airmarkets/acidrain](http://www.epa.gov/airmarkets/acidrain).

<sup>13</sup> See [www.epa.gov/airmarkets/acidrain](http://www.epa.gov/airmarkets/acidrain).

<sup>14</sup> “Turbulent Future for Eco-Tax,” *The Times* (London), June 4, 2003, p. 4; and “No More Airports, Please,” *The Daily Telegraph* (London), June 28, 2003, p. 5.

<sup>15</sup> Data available at [www.scorecard.org](http://www.scorecard.org).

## FIGURE 12.2

### Advantages and Disadvantages of Alternative Policy Approaches to Reducing Pollution

<sup>16</sup> Further information is available at [www.rtk.net](http://www.rtk.net).

<sup>17</sup> “Motiva Enterprises Settles Federal–State Lawsuit Resulting from Explosion at Delaware City Refinery,” EPA press release, September 20, 2005.

<sup>18</sup> “Europe Unites against Marine Polluters,” *Environmental News Service*, June 11, 2005, [www.ens-newswire.com](http://www.ens-newswire.com).

<sup>19</sup> For a discussion of criminal liability in environmental law, and how to avoid it, see Frank B. Friedman, *Practical Guide to Environmental Management*, 9th ed. (Washington, DC: Environmental Law Institute, 2003).

<sup>20</sup> “The Benefits and Costs of the Clean Air Act 1990 to 2010: EPA Report to Congress,” prepared for the U.S. Environmental Protection Agency, November 1999.

<sup>21</sup> “A Benefits Assessment of Water Pollution Control Programs Since 1972,” prepared for the U.S. Environmental Protection Agency, January 2000.

<sup>22</sup> “A Retrospective Assessment of the Costs of the Clean Water Act: 1972 to 1997,” prepared for the U.S. Environmental Protection Agency, October 2000; and “A Benefits Assessment of Water Pollution Control Programs Since 1972,” prepared for the U.S. Environmental Protection Agency, January 2000.

<sup>23</sup> For a study of the economic impact of the recycling and reuse industries, see National Recycling Coalition, Inc., *U.S. Recycling Economic Information Study*, prepared by R.W. Beck, Inc., July 2001.

## FIGURE 12.3

### Costs and Benefits of Environmental Regulations

<sup>24</sup> Adam B. Jaffe, Steven R. Peterson, Paul R. Portney, and Robert N. Stavins, “Environmental Regulations and the Competitiveness of U.S. Industry,” prepared for the U.S. Department of Commerce, July 1993. For another summary of the evidence that comes to a similar conclusion, see Steven Peterson, Barry Galef, and Kenneth Grant, “Do Environmental Regulations Impair Competitiveness?” prepared for the U.S. EPA, September 1995.

<sup>25</sup> Stuart Hart, “Beyond Greening Strategies for a Sustainable World,” *Harvard Business Review*, January–February 1997. All quotes in this paragraph are taken from this article. An alternative stage model may be found in Dexter Dunphy, Suzanne Benn, and Andrew Griffiths, *Organisational Change for Corporate Sustainability* (New York: Routledge, 2003).

<sup>26</sup> Information on Dow Chemical Corporation’s environmental, health, and safety programs is available at [www.dow.com/environment](http://www.dow.com/environment).

<sup>27</sup> “A Clean, Lean Electric Machine,” *The Economist*, December 10, 2005, pp. 77–79; and “GE Turns Green,” *Forbes.com*, August 15, 2005.

<sup>28</sup> “U.S. Firms Are Getting ‘Greener’ But They Fail to Codify Practices,” *The Wall Street Journal*, August 19, 2002, p. B2; and Andrew W. Savitz, “Sustainable Business Practices: Managing Risk and Opportunity,” *Re: Business*, March 2003, available at [www.pwcglobal.com](http://www.pwcglobal.com).

<sup>29</sup> Pratima Bansal and Kendall Roth, “Why Companies Go Green: A Model of Ecological Responsiveness,” *Academy of Management Journal*, August 2000, pp. 717–36.

<sup>30</sup> Mark Starik and Gordon P. Rands, “Weaving an Integrated Web: Multilevel and Multisystem Perspectives of Ecologically Sustainable Organizations,” *Academy of Management Review*, October 1995, pp. 908–35.

<sup>31</sup> Ray C. Anderson, *Mid-Course Correction: Toward a Sustainable Enterprise—The Interface Model* (Atlanta, GA: The Peregrinazilla Press, 1998). Interface’s sustainability initiatives are described at [www.interfacesustainability.com](http://www.interfacesustainability.com).

<sup>32</sup> Dennis A. Rondinelli and Ted London, “How Corporations and Environmental Groups Cooperate,” *Academy of Management Executive* 17, no. 1 (2003), pp. 61–76; and Frederick J. Long and Matthew B. Arnold, *The Power of Environmental Partnerships* (Fort Worth, TX: Dryden Press, 1995).

<sup>33</sup> “Fishing for the Future: Unilever’s Sustainable Fisheries Initiative.” Information about Unilever’s environmental initiatives is available at [www.unilever.com/ourvalues/environmentandsociety](http://www.unilever.com/ourvalues/environmentandsociety).

<sup>34</sup> Anne T. Lawrence and David Morell, “Leading-Edge Environmental Management: Motivation, Opportunity, Resources, and Processes,” *Research in Corporate Social Performance and Policy*, supp. 1 (1995), pp. 99–127; and James Maxwell, Sandra Rothenberg, Forrest Briscoe, and Alfred Marcus, “Green Schemes: Corporate Environmental Strategies and Their Implementation,” *California Management Review* 39, no. 3 (March 22, 1997), pp. 118 ff.

<sup>35</sup> Catherine A. Ramus and Ulrich Steger, “The Roles of Supervisory Support Behaviors and Environmental Policy in Employee Ecoinitiatives at Leading European Companies,” *Academy of Management Review*, August, 2000, pp. 605–26.

<sup>36</sup> *KPMG International Survey of Corporate Responsibility Reporting 2005*, [www.kpmg.com](http://www.kpmg.com). Toyota’s social and environmental reports are available at [www.toyota.co.jp](http://www.toyota.co.jp).

<sup>37</sup> For a full elaboration of this argument, see Forest L. Reinhardt, “Bringing the Environment Down to Earth,” *Harvard Business Review*, July–August 1999.

<sup>38</sup> Speech by Bill Ford, April 14, 2000, available at [www.ceres.org/eventsandnews/news/Fordspeech.html](http://www.ceres.org/eventsandnews/news/Fordspeech.html)

<sup>39</sup> Herman Miller’s sustainability initiatives are described at [www.hermanmiller.com](http://www.hermanmiller.com).

<sup>40</sup> Joel Makower, “Green Marketing and the ‘4/40 Gap,’” [www.makower.typepad.com](http://www.makower.typepad.com).

<sup>41</sup> “Environmental Report 2005,” [www.nikon.co.jp](http://www.nikon.co.jp).

<sup>42</sup> “Europe Says: Let’s Get the Lead Out,” *BusinessWeek*, February 7, 2005, p. 12.

<sup>43</sup> “BP Forms Alternative Energy Unit,” press release, November 28, 2005. More information about BP’s sustainability initiatives is available at [www.bp.com](http://www.bp.com). A list of the Global 100 most sustainable corporations is available at [www.global100.org](http://www.global100.org).

<sup>44</sup> For a recent collection of articles by leading scholars, see Sanjay Sharma and J. Alberto Aragon-Correa, eds., *Corporate Environmental Strategy and Competitive Advantage* (Northampton, MA: Edgar Elgar Academic Publishing, 2005). For a general statement of the argument that environmental management confers a competitive advantage, see Michael E. Porter and Claas van der Linde, “Green and Competitive: Beyond the Stalemate,” *Harvard Business Review*, September–October 1995, pp. 120 ff; Stuart L. Hart, “Beyond Greening: Strategies for a Sustainable World,” *Harvard Business Review*, January–February 1997, pp. 66–76; and Renato J. Orsato, “Competitive Environmental Strategies: When Does It Pay to Be Green?” *California Management Review* 48, no. 2 (Winter 2006), pp. 127–43.

## Key Terms

acid rain, 255  
command and control regulation, 258  
ecologically sustainable organization (ESO), 266  
environmental justice, 257  
environmental partnerships, 266  
Environmental Protection Agency (EPA), 253  
environmental □ standards, 258  
greening of □ management, 264  
green marketing, 269  
market-based mechanisms, 259  
source reduction, 258  
Superfund □ (CERCLA), 258  
sustainability report, 268

## Internet Resources

[www.epa.gov](http://www.epa.gov)

[www.envirolink.org](http://www.envirolink.org)

[www.GreenBiz.com](http://www.GreenBiz.com)

[www.sustainablebusiness.com](http://www.sustainablebusiness.com)

Environmental Protection Agency

Environmental organizations and news

Green Business Network

Network of sustainable small businesses

## Discussion Questions