

Energy and Environmental Policy

Externalities and Interests

Public Choice and the Environment

All human activity produces waste. We can no more “stop polluting” than we can halt our natural body functions. As soon as we come to understand that we cannot outlaw pollution and come to see pollution as a cost of human activity, we can begin to devise creative environmental policies.

Environmental Externalities. Public choice theory views pollution as a “problem” when it is not a cost to its producer—that is, when producers can ignore the costs of their pollution and shift them onto others or society in general. An “externality” occurs when one individual, firm, or government undertakes an activity that imposes unwanted costs on others. A manufacturing firm or local government that discharges waste into a river shifts its own costs to individuals, firms, or local governments downstream, who must forgo using the river for recreation and water supply or else undertake the costs of cleaning it up themselves. A coal-burning electricity-generating plant that discharges waste into the air shifts its costs to others, who must endure irritating smog. By shifting these costs to others, polluting firms lower their production costs, which allows them to lower their prices to customers and/or increase their own profits. Polluting governments have lower costs of disposing their community’s waste, which allows them to lower taxes for their own citizens. As long as these costs of production can be shifted to others, polluting individuals, firms, and governments have no incentive to minimize waste or develop alternative techniques of production.

Costs of Regulation. Environmental policies are costly. These costs are often ignored when environmental regulations are considered. Direct spending by business and government for pollution abatement and control has grown rapidly over recent years. Yet governments themselves—federal, state, and local governments combined—pay less than one-quarter of the environmental bill. Businesses and consumers pay over three-quarters of the environmental bill. Governments can shift the costs of their policies onto private individuals and

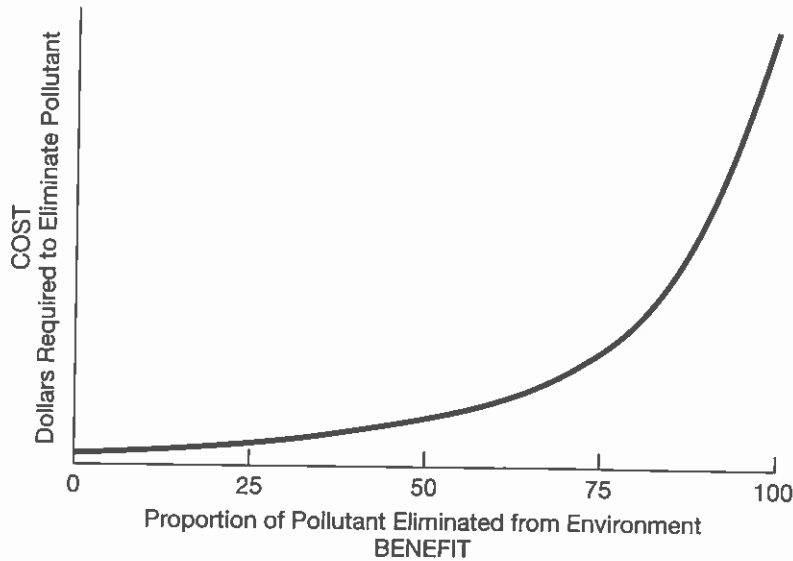


FIGURE 10-1 Cost Benefit Ratio in Environmental Protection Costs rise exponentially as society tries to eliminate the last measure of pollution.

firms by enacting *regulations* requiring pollution control. A government's own budget is unaffected by these regulations, but the costs are paid by society.

Benefits in Relation to Costs. Public choice theory requires that environmental policies be evaluated in terms of their net benefits to society; that is, the costs of environmental policies should not exceed their benefits to society. It is much less costly to reduce the first 50 to 75 percent of any environmental pollutant or hazard than to eliminate all (100 percent) of it (see Figure 10-1). As any pollutant or hazard is reduced, the cost of further reductions rises and the net benefits to society of additional reductions decline. As the limit of zero pollution or zero environmental risk is approached, additional benefits are minuscule but additional costs are astronomical. Ignoring these economic realities simply wastes the resources of society, lowers our standard of living, and in the long run impairs our ability to deal effectively with any societal problem, including environmental protection.

Environmental Externalities

The air and water in the United States are far cleaner today than in previous decades. This is true despite growth in population and even greater growth in waste products. Nonetheless, genuine concern for environmental externalities centers on the disposal of solid waste (especially hazardous wastes), water pollution, and air pollution.

Solid Waste Disposal. Every American produces about 4.5 pounds of solid waste per day (see Table 10-1). The annual load of waste dumped on the environment includes 82 million

TABLE 10–1 Growth in Solid Wastes Each day the average American produces more than four pounds of waste; about 30 percent of waste can be recycled.

	1960	1970	1980	1990	2000	2005
Gross waste (millions of tons)	87.50	120.50	151.2	205.2	231.9	245.7
Waste per person per day (lb)	2.65	3.22	3.7	4.5	4.5	4.5
Percent recycled	NA	NA	9.6	16.4	30.1	32.1

SOURCE: *Statistical Abstract of the United States, 2008*, p. 229.

tons of paper, 48 billion cans, 26 billion bottles and jars, 2 billion disposable razors, 16 billion disposable diapers, and 4 million automobiles and trucks. The nation spends billions of dollars annually on hauling all this away from homes and businesses.

There are three methods of disposing of solid wastes—landfills, incineration, and recycling. Modern landfills have nearly everywhere replaced town dumps. Landfills are usually lined with clay so that potentially toxic wastes do not seep into the water system. Even so, hazardous wastes are separated from those that are not hazardous and handled separately. Given a reasonable site, there is nothing especially wrong with a landfill that contains no hazardous wastes. However, landfill sites need to meet strict standards and people do not want landfills near their residences. These conditions combine to make it difficult to develop new landfills.

Contrary to popular rhetoric, there is no “landfill crisis”; the nation is not “running out of land.” However, both government agencies and private waste disposal firms are frequently stymied by the powerful, organized NIMBYs (“not in my back yard”). Landfill sites are plentiful but local opposition is always strong. Timid politicians cannot confront the NIMBYs, so they end up overusing old landfills or trying to ship their garbage elsewhere.

Another alternative is to burn the garbage. Modern incinerators are special plants, usually equipped with machinery to separate the garbage into different types, with scrubbers to reduce air pollution from the burning and often with electrical generators powered by heat from the garbage fire. Garbage is put through a shredder to promote even burning; metal is separated out by magnets, and the garbage is passed over screens that separate it further. At this point about half the garbage has been removed and hauled to a landfill. The remaining garbage is shredded still further into what is called fluff, or perhaps it is compressed into pellets or briquets. This material is then burned, usually at another site and perhaps together with coal, to produce electricity. The ash is handled by the public utility as it would handle any other ash, which often means selling it to towns to use on roads. One problem with this method is the substances emitted from the chimney of the incinerator or the utility that is burning the garbage. Another problem: because the garbage separated during the screening phase still has to be disposed of, the need for landfill sites is only reduced, not eliminated.

A third method of reducing the amount of solid waste is recycling. Recycling is the conversion of wastes into useful products. Most of the time, waste cannot be recycled into the same product it was originally but rather into some other form. Newspapers are recycled into cardboard, insulation, animal bedding, and cat litter, but in an exception to the general rule, some are recycled into newsprint.

Overall, about 30 percent of all solid waste in the United States is recovered for reuse.¹ This is a notable improvement over the mere 10 percent that was recycled 30 years ago. Some materials lend themselves fairly well to recycling (e.g., aluminum cans, paper products), but other materials do not (e.g., plastics). At present there is more material available for recycling than plants can effectively use; millions of tons of recycled newspapers are either piled up as excess inventory in paper mills or dumped or burned. Nonetheless, recycling does have an effect in reducing the load on incinerators and landfills.

Hazardous Waste. Hazardous (toxic) wastes are those that pose a significant threat to public health or the environment because of their “quantity, concentration, or physical, chemical, or infectious characteristics.”² The Resource Conservation and Recovery Act of 1976 gave the Environmental Protection Agency (EPA) the authority to determine which substances are toxic and the EPA has so classified several hundred substances. Releases of more than a specified amount must be reported to the National Response Center. Substances are considered hazardous if they easily catch fire, are corrosive, or react easily with other chemicals. Many substances are declared toxic by the EPA because massive daily doses administered to laboratory animals cause cancers to develop. Toxic chemical releases must also be reported annually. These reports show that toxic releases have been reduced by more than half over the last decade.³ Thus far, the United States has avoided any toxic releases comparable to the accident in Bhopal, India, in 1984, which killed almost 3,000 people.

Nuclear wastes create special problems. These are the wastes from nuclear fission reactors and nuclear weapons plants. Some have been in existence for 50 years. Because the waste is radioactive and some of it stays radioactive for thousands of years, it has proven very difficult to dispose of. Current plans to store some wastes in deep, stable, underground sites have run into local opposition. Most nuclear waste in the United States is stored at the site where it was generated, pending some long-term plan for handling it.

Hazardous wastes from old sites also constitute an environmental problem. These wastes need to be moved to more secure landfills. Otherwise, they can affect the health of people living near the waste site, often by seeping into the water supply. The EPA is committed to cleaning up such sites under the Superfund laws of 1980 and 1986. As a first step, it developed a National Priority List of sites that needs attention, based on a hazard ranking system. The EPA listed about 1,300 hazardous waste sites. Cleanups have been done by the EPA itself, other federal state or local government agencies, or the company or party responsible for the contamination.

Water Pollution. Debris and sludge, organic wastes, and chemical effluents are the three major types of water pollutants. These pollutants come from (1) domestic sewage, (2) industrial waste, (3) agricultural runoff of fertilizers and pesticides, and (4) “natural” processes, including silt deposits and sedimentation, which may be increased by nearby construction. A common standard for measuring water pollution is biochemical oxygen demand (BOD), which identifies the amount of oxygen consumed by wastes. This measure, however, does not consider chemical substances that may be toxic to humans or fish. It is estimated that domestic sewage accounts for 30 percent of BOD, and industrial and agricultural wastes for 70 percent.

Primary sewage treatment—which uses screens and settling chambers, where filth falls out of the water as sludge—is fairly common. Secondary sewage treatment is designed

to remove organic wastes, usually by trickling water through a bed of rocks 3 to 10 feet deep, where bacteria consume the organic matter. Remaining germs are killed by chlorination. Tertiary sewage treatment uses mechanical and chemical filtration processes to remove almost all contaminants from water. Some cities dump sewage sludge into the ocean after only primary treatment or no treatment at all. Although federal law prohibits dumping raw sewage into the ocean, it has proven difficult to secure compliance from coastal cities. Federal water pollution abatement goals call for the establishment of secondary treatment in all American communities. In most industrial plants, tertiary treatment ultimately will be required to deal with the flow of chemical pollutants. But tertiary treatment is expensive; it costs two or three times as much to build and operate a tertiary sewage treatment plant as it does a secondary plant.

Phosphates are major water pollutants that overstimulate plant life in water, which in turn kills fish. Phosphates run off from fertilized farm land. Farming is the major source of water pollution in the United States.

Waterfronts and seashores are natural resources. The growing numbers of waterfront homes, amusement centers, marinas, and pleasure boats are altering the environment of the nation's coastal areas. Marshes and estuaries at the water's edge are essential to the production of seafood and shellfish, yet they are steadily shrinking with the growth of residential-commercial-industrial development. Oil spills are unsightly. Although pollution is much greater in Europe than in America, America's coastal areas still require protection. Federal law makes petroleum companies liable for the cleanup costs of oil spills and outlaws flushing of raw sewage from boat toilets. The *EXXON Valdez* oil spill in Alaska in 1989 focused attention on the environmental risks of transporting billions of barrels of foreign and domestic oil each year in the United States.

The federal government has provided financial assistance to states and cities to build sewage treatment plants ever since the 1930s. Efforts to establish national standards for water quality began in the 1960s and culminated in the Water Pollution Control Act of 1972. This "Clean Water Act" set "national goals" for elimination of all discharges of *all* pollutants into navigable waters; it required industries and municipalities to install "the best available technology"; it gave the EPA authority to initiate legal actions against pollution caused by firms and governments; it increased federal funds available to municipalities for the construction of sewage treatment plants.

The EPA is authorized by the Safe Drinking Water Act of 1974 to set minimum standards for water quality throughout the nation. The EPA does not set a zero standard for fecal bacteria or phosphate or other pollutants; to do so would commit the nation to astronomical cost projections for "clean" water and would never be possible to attain anyway. The EPA has considerable power to raise or lower standards, and hence to increase or reduce costs.

Water quality in the United States has improved significantly over the years (see Table 10-2). The problem, of course, is that removing *all* pollutants is neither cost-effective nor possible.

Air Pollution. The air we breathe is about one-fifth oxygen and a little less than four-fifths nitrogen, with traces of other gases, water vapor, and the waste products we put into it. Air pollution is caused, first of all, by the gasoline-powered internal combustion engines of cars, trucks, and buses. The largest industrial polluters are petroleum refineries, smelters (aluminum, copper, lead, and zinc), and iron foundries. Electrical power plants also contribute

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TABLE 10–2 Improvements in Water Quality Water quality has improved dramatically over the last three decades.

Pollutant (Standard)	1975	1980	1985	1990	1995	2000
Fecal coliform bacteria (above 200 cells per 100 mL)	36	31	28	26	28	26
Dissolved oxygen (allow 5 mg per liter)	5	5	3	2	1	1
Phosphorus (above 1 mg per liter)	5	4	3	3	4	4
Lead (above 50 micrograms per liter)	NA	5	0	0	0	0

NOTE: Figures are violations rates—the proportion of measures that violate the EPA standards.

SOURCE: Environmental Protection Agency, *National Water Quality Inventory*, 2002.

to total air pollutants by burning coal or oil for electric power. Heating is also a major source of pollution; homes, apartments, and offices use coal, gas, and oil for heat. Another source of pollution is the incineration of garbage, trash, metal, glass, and other refuse by both governments and industries.

Air pollutants fall into two major types: particles and gases. The particles include ashes, soot, and lead, the unburnable additive in gasoline. Often the brilliant red sunsets we admire are caused by large particles in the air. Less obvious but more damaging are the gases: (1) sulfur dioxide, which in combination with moisture can form sulfuric acid; (2) hydrocarbons—any combination of hydrogen and carbon; (3) nitrogen oxide, which can combine with hydrocarbons and the sun's ultraviolet rays to form smog; and (4) carbon monoxide, which is produced when gasoline is burned.

The EPA sets limits on fine particulate matter (soot, dust) in the air. But many large cities, for example New York, Los Angeles, Chicago, and Washington, DC, exceed these limits. A recent federally financed study reported that “the risk of dying from lung cancer as well as heart disease in the most polluted cities was comparable to the risk associated with non-smokers being exposed to second-hand smoke over a long period of time.”⁴

The air we breathe is significantly cleaner today than thirty years ago (see Figure 10–2). Federal clean air legislation (described later in this chapter) is generally credited with causing

	Millions of Tons Per Year							Percent Change 1980–2006
	1980	1985	1990	1995	2000	2005	2006	
Carbon Monoxide (CO)	178	170	144	120	102	91	88	–50
Lead	0.074	0.023	0.005	0.004	0.002	0.003	0.002	–97
Nitrogen Oxides (NO _x)	27	26	25	25	22	19	18	–33
Volatile Organic Compounds (VOC)	30	27	23	22	17	15	15	–50
Particulate Matter (PM ₁₀)	6.2	3.6	3.2	3.1	2.3	2.6	2.6	–58
Sulfur Dioxide (SO ₂)	26	23	23	19	16	15	14	–47
Totals	267	249	218	189	159	142	137	–49

SOURCE: www.epa.gov/air/airtrends.

FIGURE 10–2 Improvements in Air Quality Contrary to much popular opinion, the air is much cleaner today than in prior years.

these improvements. The Environmental Protection Agency claims that the Clean Air Act of 1970 and subsequent amendments to it have resulted in an overall reduction in principal pollutants since 1970 of 57 percent. This improvement in air quality has come about despite increases in the gross domestic product (207 percent), vehicle miles traveled (179 percent), energy consumption (49 percent), and population growth (47 percent). (See Figure 10–3.)

Interest Group Effects

Americans live longer and healthier lives today than at any time in their country's history. Life expectancy at birth is now 78.5 years (75.6 for males; 81.4 for females), up eight full years since 1970. Cancer deaths are up slightly but not because of environmental hazards. The primary causes of premature death are what they have always been: smoking, diets rich in fat and lean in fiber, lack of exercise, and alcohol abuse. Yet public opinion generally perceives the environment as increasingly contaminated and dangerous, and this perception drives public policy.

Interest Group Economics. Organized environmental interests must recruit memberships and contributions (see Table 10–3). They must justify their activities by publicizing and dramatizing environmental threats. When Greenpeace boats disrupt a U.S. Navy exercise, they are attracting the publicity required for a successful direct-mail fund-raising drive. The mass media, especially the television networks, welcome stories that capture and hold audiences' attention. Stories are chosen for their emotional impact, and threats to personal life and safety satisfy the need for drama in the news. Statistics that indicate negligible risks or scientific testimony that minimizes threats or presents ambiguous findings do not make good news stories. Politicians wish to be perceived as acting aggressively to protect citizens from any risk, however minor. Politicians want to be seen as "clean" defenders of the pristine wilderness. And government bureaucrats understand that the greater the public fear of environmental threat, the easier it is to justify expanded powers and budgets.

Shaping Public Opinion. Interest group activity and media coverage of environmental threats have succeeded in convincing most Americans that environmental pollution is getting worse. Evidence that the nation's air and water are measurably cleaner today than in the 1970s is ignored. Opinion polls report that 57 percent of Americans agree with this statement: "Protecting the environment is so important that requirements and standards cannot be too high and continued environmental improvements must be made *regardless of cost*."⁵ If

TABLE 10–3 Leading Environmental Organizations Environmental politics in Washington are heavily influenced by environmental interest groups.

National Wildlife Federation	Natural Resources Defense Council
Greenpeace	Environmental Defense Fund
National Audubon Society	Defenders of Wildlife
Sierra Club	Friends of the Earth
Wilderness Society	Union of Concerned Scientists

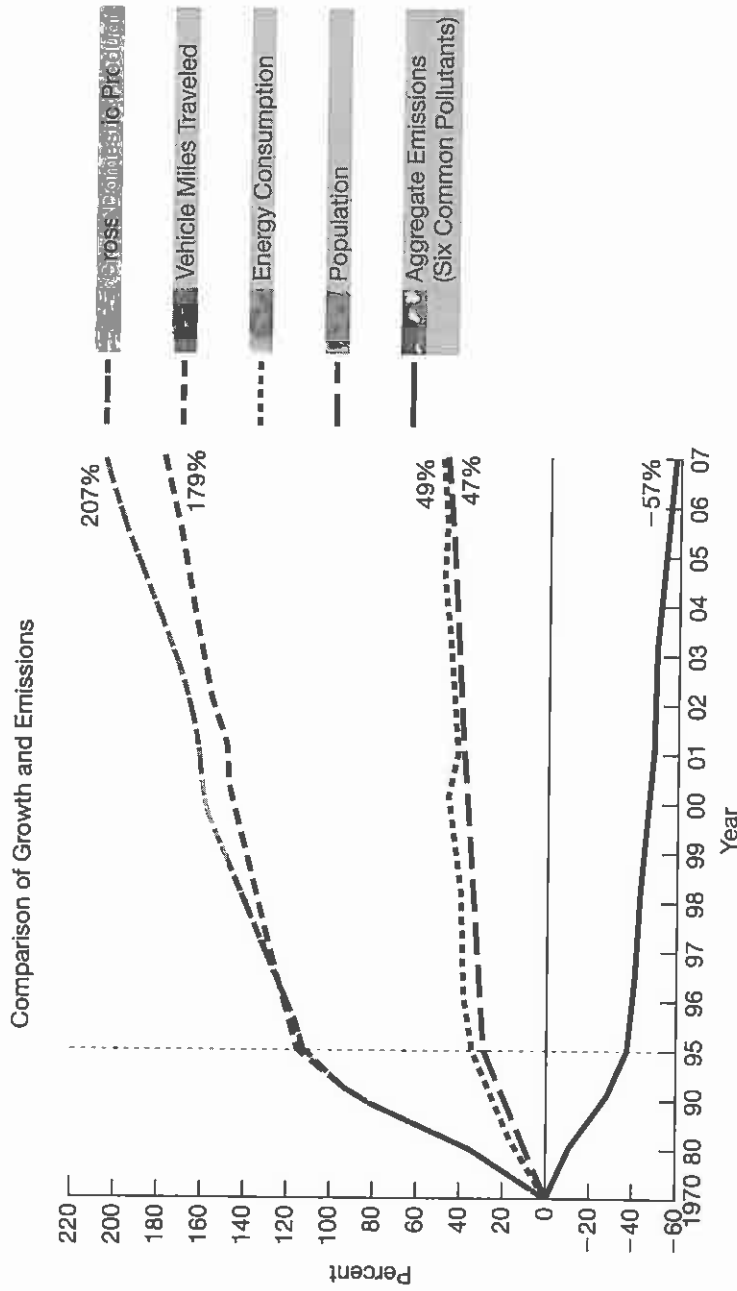


FIGURE 10-3 Comparison of Growth and Emissions Air pollution has decreased even while the economy has grown, the population has grown, more miles are traveled, and more energy is consumed.
 SOURCE: Environmental Protection Agency, "Six Common Air Pollutants," www.epa.gov.

taken seriously, such an attitude would prevent either scientific or economic considerations from guiding policy. Environmentalism threatens to become a moral crusade that dismisses science and economics as irrelevant or even wicked. In such a climate of opinion, moral absolutism replaces rational public policy.

Interest Group Politics. Everyone is opposed to pollution. It is difficult publicly to oppose clean air or clean water laws—who wants to stand up for dirt? Thus the environmentalists begin with a psychological and political advantage: they are “clean” and their opponents are “dirty.” The news media, Congress, and executive agencies can be moved to support environmental protection measures with little consideration of their costs—in job loss, price increases, unmet consumer demands, increased dependence on foreign sources of energy. Industry—notably the electric power companies, oil and gas companies, chemical companies, automakers, and coal companies—must fight a rearguard action, continually seeking delays, amendments, and adjustments in federal standards. They must endeavor to point out the increased costs to society of unreasonably high standards in environmental protection legislation. But industry is suspect; the environmentalists can charge that industry opposition to environmental protection is motivated by greed for higher profits. And the charge is partially true, although most of the cost of antipollution efforts is passed on to the consumer in the form of higher prices.

The environmentalists are generally upper-middle-class or upper-class individuals whose income and wealth are secure. Their aesthetic preferences for a no-growth, clean, unpolluted environment take precedence over jobs and income, which new industries can produce. Workers and small business people whose jobs or income depend on energy production, oil refining, forestry, mining, smelting, or manufacturing are unlikely to be ardent environmentalists. But there is a psychological impulse in all of us to preserve scenic beauty, protect wildlife, and conserve natural resources. It is easy to perceive industry and technology as the villain, and “man against technology” has a humanistic appeal.

NIMBY Power. Environmental groups have powerful allies in the nation’s NIMBYs—local residents who feel inconvenienced or threatened by specific projects. Even people who otherwise recognize the general need for new commercial or industrial developments, highways, airports, power plants, pipelines, or waste disposal sites, nonetheless voice the protest “not in my back yard,” earning them the NIMBY label. Although they may constitute only a small group in a community, they become very active participants in policymaking—meeting, organizing, petitioning, parading, and demonstrating. NIMBYs are frequently the most powerful interests opposing specific developmental projects and are found nearly everywhere. They frequently take up environmental interests, using environmental arguments to protect their own property investments.

Radical Environmentalism. At the extreme fringe of the environmental movement one finds strong opposition to economic development, to scientific advancement, and even to humanity. According to the Club of Rome (a radical environmental organization), “The real enemy, then, is humanity itself.”⁶ The “green” movement is international, with well-organized interest groups and even political parties in Western European nations. Its program to “Save the Planet” includes the deindustrialization of Western nations; reduction of

the human population; elimination of all uses of fossil fuels, including automobiles; the elimination of nuclear power; an end to cattle raising, logging, land clearance, and so on; and the transfer of existing wealth from the industrialized nations to underdeveloped countries.⁷

Global Warming/Climate Change

Gloomy predictions about catastrophic warming of the Earth's surface have been issued by the media and environmental interest groups in support of massive new regulatory efforts. Global warming is theorized to be a result of emissions of carbon dioxide and other gases that trap the sun's heat in the atmosphere. As carbon dioxide increases in the atmosphere as a result of increased human activity, more heat is trapped. Deforestation contributes to increased carbon dioxide by removing trees, which absorb carbon dioxide and produce oxygen. The dire predictions of greenhouse effects include droughts and crop destruction, melting of the polar ice caps, and ocean flooding.

Climate Change. It is true that the Earth's atmosphere creates a greenhouse effect; if not, temperatures on the Earth's surface would be like those on the moon—unbearably cold (-270°F) at night and unbearably hot ($+212^{\circ}\text{F}$) during the day. The greenhouse gases, including carbon dioxide, moderate the Earth's surface temperature. And it is true that carbon dioxide is increasing in the atmosphere, an increase of about 25 percent since the beginning of the Industrial Revolution in 1850, and 13 percent since 1970 (see Figure 10-4).

It is also true that the Earth has been warming over the past century, since the beginning of the Industrial Revolution. Global average temperatures have risen about 1.4°F . Average sea levels have risen and the northern hemispheric snow cover has diminished. Various computer simulations of the effect of increased dioxides in the atmosphere have predicted future increases in temperature ranging from 1° (not significant) to 8° (significant if it occurs rapidly).⁸

Global climate change is caused by a variety of factors: slight changes in the Earth's orbit, causing ice ages over millennia (the last ice age, when average temperatures were 9° cooler, ended 15,000 years ago.); solar activity including sun flares (a "little" ice age between 1500–1850 is estimated to have cooled the Earth by about 2°F); and volcanic activity, which tends to block sunlight and contribute to short-term cooling (a volcano in Indonesia in 1815 lowered global temperatures by 5°F and historical accounts in New England described 1816 as "the year without a summer").

Is human activity contributing to global warming? Fossil fuels emit carbon dioxide (CO_2) into the atmosphere. Since the beginning of the Industrial Revolution atmospheric carbon dioxide concentrations have increased by about 25 percent. This increase corresponds to an increase in average global temperature (see Figure 10-4). This correspondence does not prove causation, but it underlies the fundamental argument of global warming theory.

International Panel on Climate Change. A UN-sponsored International Panel on Climate Change (IPCC) reported with "very high confidence" that human activity since the Industrial Revolution has contributed to increases in atmospheric concentrations of carbon dioxide, methane, and nitrous oxide.⁹ The IPCC does not do its own research but rather

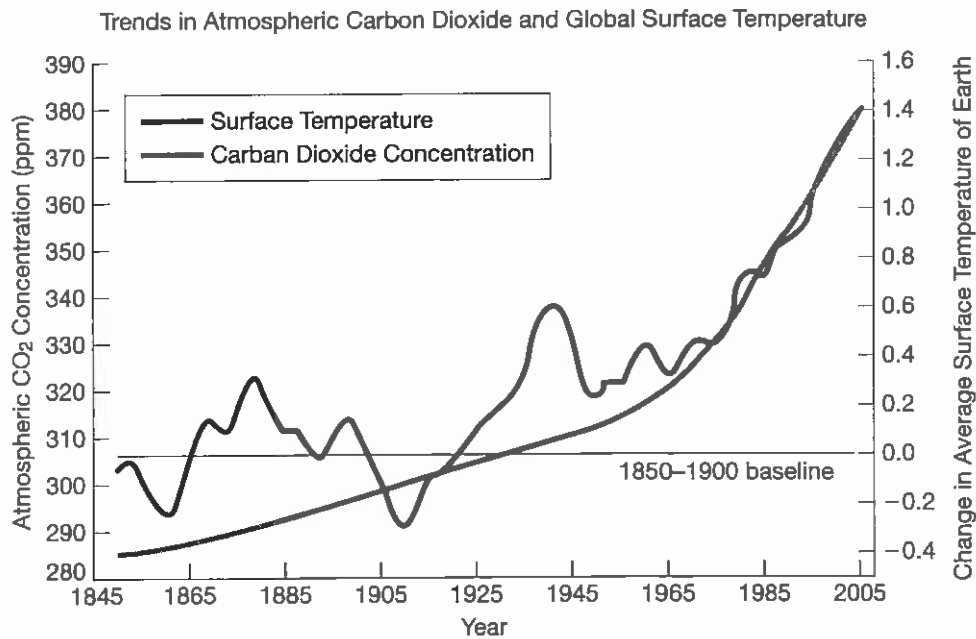


FIGURE 10-4 Trends in Atmospheric Carbon Dioxide and Global Surface Temperature Recent increases in atmospheric concentrations of carbon dioxide (CO₂) have corresponded with increases in average surface temperatures on Earth. The sharpest rises in CO₂ and temperatures have occurred since 1970.

SOURCE: Pew Center on Global Climate Change, www.pewclimate.org.

assesses scientific reports from other bodies. Its *Fourth Assessment Report: Climate Change 2007* is widely cited by environmentalists: “Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [caused by human activity] greenhouse gas concentrations.” The popularity of the report was reflected in the awarding of a Nobel Prize to the IPCC and to its principal publicist, Al Gore. Gore’s movie, *An Inconvenient Truth* dramatizes the effects of global warming.

Greenhouse Gases. Carbon dioxide (CO₂) contributes about three-quarters of total greenhouse gas emissions; methane and nitrous oxide are also classified as greenhouse gases. The principal source of CO₂ emissions are power plants (30 percent), industrial processes (21 percent), transportation (19 percent), residential (13 percent), land use (9 percent), and other fossil fuel uses (8 percent). Any serious effort to reduce overall greenhouse gas emissions must deal with electric utilities, waste disposal facilities, natural gas producers, petroleum refineries, smelters, and motor vehicle emissions, among other sources.

Recently China surpassed the United States as the largest single national contributor of atmospheric pollutants. Both nations together currently produce about 50 percent of the world’s output of greenhouse gases. But China, together with India and Indonesia, contributes to the largest annual *increases* in greenhouse emissions. Whatever policies the

United States adopts to limit its own emissions, the Earth's atmosphere will continue to be polluted by other nations. Environmentalists argue that the United States must act first in order to set an example for the world.

The Rio Treaty. Environmentalists argue that “drastic action” is required now to avert “catastrophic” global warming. Former Vice President Al Gore is a leading exponent of the view that governments cannot afford to wait until the scientific evidence demonstrates conclusively that human activity contributes to global warming. Rather, governments must immediately impose a system of “global environmental regulations” in order to “save the planet.”¹⁰ Inasmuch as Third World nations are just beginning to industrialize, they pose the greatest threat of new sources of global pollution. But the industrialized nations are responsible for “undermining the Earth's life support system” (the United States is usually singled out as the primary culprit), and therefore they must compensate poorer nations in exchange for their pledge not to add to global pollution. The international environmental agenda includes massive transfers of wealth from industrialized nations to less developed countries.

The Rio Treaty incorporates these ideas. It is a product of the “Earth Summit,” officially the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil, in 1992. It was attended by 178 nations as well as hundreds of environmental interest groups, officially sanctioned as “nongovernmental organizations” or “NGOs.” The conference produced a Global Climate Change Treaty, signed by President George H.W. Bush, but not ratified by the U.S. Senate, which declares, among other things, that “lack of scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”! The statement is, of course, a contradiction: without scientific information, it is impossible to determine cost-effectiveness.¹²

Copenhagen Conference. Governments and non-governmental organizations have been meeting in Copenhagen Denmark with the goal of developing a legally binding treaty to reduce world-wide carbon emissions. The negotiations are sponsored by the UN Framework Convention on Climate Change. The United States is among the 192 countries participating in the Conference; the United States favors the development of nonbinding pledges regarding carbon emissions, rather than legally binding emissions cuts. Less developed nations have demanded compensation from the developed nations in exchange for limiting growth in their emissions. At present the prospects for agreement appear dim.

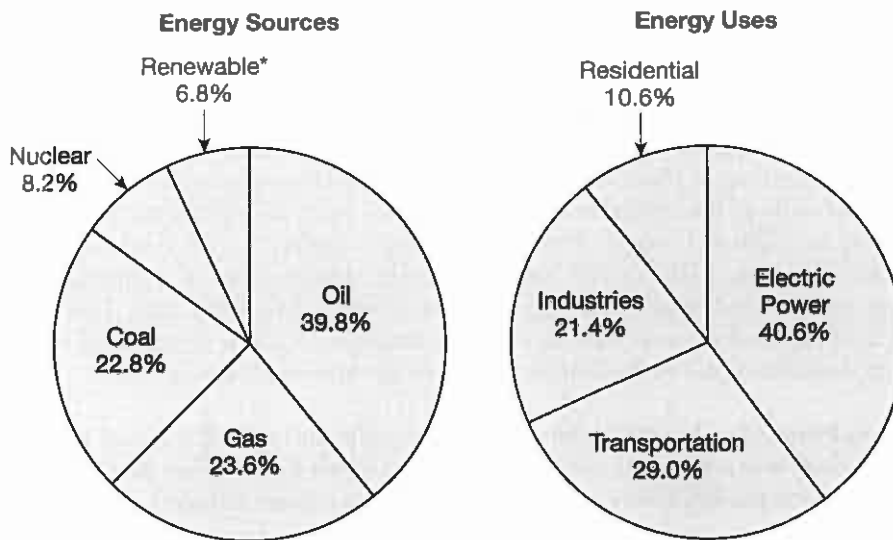
The Kyoto Protocol. In 1997, a far-reaching amendment to the Rio Treaty, known as the Kyoto Protocol, was negotiated under the United Nations Convention on Global Climate Change. Whereas the Rio Treaty set voluntary national goals for reducing greenhouse gases, the Kyoto agreement required the United States and other developed nations to reduce their emissions below 1990 levels sometime between 2008 and 2012. Reductions by developed nations were designed to offset expected increases in emissions by developing nations. The reduction mandated for the United States was 7 percent below its 1990 level—a reduction that would entail approximately a 40 percent reduction in fossil fuel use. The Clinton administration supported the Kyoto Protocol, but declined to submit it for ratification to the U.S. Senate in view of its likely defeat in that body. The Bush administration opposed the Protocol.

Energy Policy

Environmental policy and energy policy are closely intertwined. Currently America gets most of its energy from fossil fuels—oil, natural gas, and coal (see Figure 10–5). These sources produce pollutants, including carbon dioxide emissions that appear related to global climate change. Despite heavy subsidization by the federal government, “renewable” energy sources—hydroelectric, geothermal, solar, wind, and biomass—account for only about 7 percent of the energy used in the United States.

Energy Consumption. Electric power plants account for the greatest share of energy produced in the United States (see Figure 10–5). About half of all electric generating plants are powered by coal; almost 20 percent are nuclear powered; most of the remainder are powered from oil or natural gas; less than 10 percent of electric power is derived from renewable energy sources. Transportation accounts for nearly 30 percent of total energy use in America, almost all of it from oil.

Energy consumption *per person* in United States has stabilized over the last thirty years. Growth in overall energy consumption has matched population growth. Energy consumption has actually *declined* relative to the gross national product, suggesting that America is becoming more efficient over time in energy use. And energy expenditures have declined as a share of the GDP. This good news is not widely reported in the mass media.



*Hydroelectric, geothermal, solar, wind, biomass.

FIGURE 10–5 Energy Sources and Uses The U.S. gets most of its energy from oil, gas, and coal, all of which produce greenhouse gases. Clean nuclear and renewable sources provide relatively little energy for the country. Electric power plants and motor vehicles together use nearly 70 percent of the energy generated.

SOURCE: Data from Energy Information Administration, U.S. Department of Energy, www.eia.doe.gov.

Energy Supply. Supply-side energy policies emphasize the search for more sources of energy. Domestic oil production can be increased through exploration and drilling in public lands and offshore waters. (“Drill, baby, drill” became a popular slogan at Republican campaign stops in 2008.) Drilling in the Alaska National Wildlife Refuge (ANWR) in Alaska is an especially controversial option. Natural gas is more plentiful than petroleum, but its widespread use would require a complete overhaul of the nation’s automobile and truck fleets to run on natural gas rather than gasoline. Nuclear power promises a clean source of energy for electrical power plants, but to date political struggles have effectively foreclosed the nuclear option (see “Nuclear Industry Meltdown” later in this chapter). The federal government heavily subsidizes research and development into “renewable” energy sources—land, solar, geothermal, and biomass (including ethanol production from corn). But none of these sources appear to be commercially feasible on any significant scale. Nevertheless the call for greater reliance on these sources of energy remains politically very popular.

Fuel Efficiency. The federal government requires automobile manufacturers to maintain corporate average fuel efficiency (CAFE) standards in the production of automobiles and light trucks. These averages are calculated from highway miles-per-gallon figures for all models of cars and light trucks produced by each manufacturer. (In recent years, the CAFE standards for cars has been 27.5 miles per gallon, and for light trucks, vans, and sports utility vehicles, 22.2 miles per gallon.) Determining CAFE standards engenders near constant political conflict in Washington, pitting auto manufacturers and auto workers’ unions against environmental and consumer groups. The popularity of pickup trucks, minivans, and sports utility vehicles means that overall fuel efficiency on the roads is difficult to improve. Alternative fuel vehicles and hybrids—cars powered entirely or in part by electricity, natural gas, hydrogen, ethanol, etc.—constitute less than 5 percent of new vehicle sales.

Projections. The U.S. Department of Energy annually produces an “Energy Outlook” that projects energy use in greenhouse gas emissions to 2030. Among its current projections:¹¹

- Growth in energy consumption in greenhouse gas emissions is likely to moderate as a result of government policies and high energy prices.
- Fossil fuels will continue to provide nearly 80 percent of total energy use.
- Energy efficiencies will cause declines in per capita energy use and declines in energy use per dollar of GDP.
- Hybrid motor vehicles—partly powered by electricity—are projected to increase significantly in numbers.
- Growth in electrical use will moderate with improved efficiency in homes and industry.
- Nonrenewable energy sources will increase, but remain less than 10 percent of total energy supply.
- Growth in energy-related carbon dioxide emissions will slow along with slowing growth in energy use.

Cap and Trade

In his first budget message to Congress, President Barack Obama recommended an innovative approach to energy policy. In addition to pledging federal subsidies for research and development in “clean energy technologies,” he proposed a new carbon emissions trading program known as “cap and trade.”

A Ceiling on Carbon Emissions. The cap and trade program envisions the federal government setting overall national ceilings on carbon emissions. The government would then hold a national auction in which polluting industries and firms could purchase tradable emission allowances. The total amount of emission allowances auctioned off would not exceed the cap. In effect, industries would be purchasing allowances to pollute. These allowances could be traded on an open market, allowing polluting industries to keep polluting but at a price, and at the same time, encouraging industries to invest dollars in reducing carbon emissions. An industry that succeeded in reducing emissions below its allowance could then sell its allowance to other industries.

Relying in Part on the Market Mechanism. The cap and trade approach to reducing carbon emissions is recommended over direct regulatory control. Because it relies in part on a market mechanism, it is sometimes labeled free-market environmentalism. Setting the overall cap is a regulatory measure, but individual firms are free to choose how or if they will reduce their emissions. The system encourages innovation by individual firms. If they are successful in reducing their emissions, they can sell their allowances to other firms.

Costs to Consumers. The cost of the cap and trade program would be borne by all energy users. The federal government would actually make money from auction revenues. The costs to energy consumers would be largely invisible, passed on by industries in the form of price increases. Everything from gasoline prices to electric bills would incorporate the prices industries paid for emission allowances at auction or in trades.

Enforcement. The federal government would put in place a vast new bureaucracy to oversee the carbon emissions of individual industries and firms. It will be necessary to measure the “carbon footprint” of industries and firms to ensure that they are operating within the emission allowances purchased at auction or in trade.

The Nuclear Industry Meltdown

Nuclear power is the cleanest and safest form of energy available. But the political struggle over nuclear power has all but destroyed early hopes that nuclear power could reduce U.S. dependence on fossil fuels. Nuclear power once provided about 20 percent of the nation’s total energy. Many early studies recommended that the United States strive for 50 percent nuclear electric generation. But under current policies it is unlikely that nuclear power will ever be able to supply any more energy than it does today—less than ten percent (see Figure 10–5). The nuclear industry itself has been in a state of “meltdown,” and the cause of the meltdown is political, not technological.

History of Regulation. In its developmental stages, nuclear power was a government monopoly. The Atomic Energy Act of 1946 created the Atomic Energy Commission (AEC), which established civilian rather than military control over nuclear energy. The AEC was responsible for the research, development, and production of nuclear weapons, as well as the development of the peaceful uses of nuclear energy. The AEC contracted with the Westinghouse Corporation to build a reactor and with the Duquesne Light Company to operate the world's first nuclear power plant at Shippingport, Pennsylvania, in 1957. Under the Atomic Energy Act of 1954 the AEC granted permits to build, and licenses to operate, nuclear plants; the AEC also retained control over nuclear fuel.

The AEC promoted the growth of the nuclear industry for over 20 years. But opponents of nuclear power succeeded in the Energy Reorganization Act of 1974 in separating the nuclear regulatory function from the research and development function. Today a separate agency, the Nuclear Regulatory Commission (NRC), regulates all aspects of nuclear power. Only 104 nuclear power plants are currently in the United States today.

“No-nukes.” Nuclear power has long been under attack by a wide assortment of “no-nuke” groups. The core opposition is found among environmental activist groups. But fear plays the most important role in nuclear politics. The mushroom cloud image of the devastation of Japanese cities at the end of World War II is still with us. The mass media cannot resist dramatic accounts of nuclear accidents. The public is captivated by the “China syndrome” story—an overheated nuclear core melts down the containing vessels and the plant itself and releases radioactivity that kills millions.

Nuclear power offers a means of generating electricity without discharging any pollutants into the air or water. It is the cleanest form of energy production. It does not diminish the world's supply of oil, gas, or coal. However, used reactor fuel remains radioactive for hundreds of years and there are potential problems in burying this radioactive waste. Spent fuel is now piling up in storage areas in specially designed pools of water at nuclear power sites. When these existing storage places are filled to capacity, spent fuel will have to be transported somewhere else, adding to new complaints about the dangers of radioactive waste. There are many technical alternatives in dealing with waste, but there is no political consensus about which alternative to choose.

Safety. The nuclear power industry in the United States has a 60-year record of safety. No one has ever died or been seriously harmed by radioactivity from a nuclear power plant in the United States. This record includes more than 100 nuclear power plants operated in the United States and hundreds of nuclear-powered surface and submarine ships operated by the U.S. Navy. Despite sensational media coverage, the failure of the nuclear reactor at Three Mile Island, Pennsylvania, in 1979 did not result in injury to anyone or cause damage beyond the plant. There are about 450 nuclear power plants operating outside of the United States. France generates 76 percent of its electricity by nuclear means. The worst nuclear accident in history occurred at Chernobyl in the Ukraine in 1986; it resulted in 31 immediate-term deaths from radiation.

Zero risk is an impossible standard, and the costs of efforts to approach zero risk are astronomical. Under popular pressure to achieve near-zero risk, the NRC has imposed licensing requirements that now make nuclear plants the most expensive means of generating

electricity. No new nuclear plants have been built in over two decades, and private utilities have canceled dozens of planned nuclear plants.

The stated policy of the national government may be to keep open the nuclear power option, but the actual effect of nuclear regulatory policy has been to foreclose that option.

The Future of Nuclear Power. What are the prospects for a “nuclear renaissance”? A variety of factors suggest a reexamination of the utility of nuclear power: the U.S. Department of Energy projects that electricity demand will rise 25 percent by 2030, requiring the construction of hundreds of new power plants; oil price increases make nuclear power generation more competitive; concerns over global warming and pollution from fossil fuel use drive a new interest in nuclear power; and national security concerns regarding U.S. dependence on foreign oil suggests the need to develop reliable domestic power sources.

But reviving the nuclear energy industry will require, first of all, a streamlined and cost-conscious regulatory environment, one that encourages private companies to make the long-term capital investments required to bring new nuclear plants into operation. Secondly, the federal government must decide on, finance, and implement a nuclear waste management program, one that includes spent nuclear materials from both military and private power uses. Finally, nuclear power cannot be revived without federal subsidies and loan guarantees for private power companies to encourage them to move forward building new nuclear plants. Yet even if Washington responded favorably to nuclear industry requirements, new plants are not likely to begin producing power in the United States for another ten years.

Politicians and Bureaucrats: Regulating the Environment

Federal environmental policymaking began in earnest in the 1970s with the creation of the Environmental Protection Agency (EPA) and the passage of clean air and water acts. Potentially, the EPA is the most powerful and far-reaching bureaucracy in Washington today, with legal authority over any activity in the nation that affects the air, water, or ground.

The Environmental Protection Agency. The EPA was created in an executive order by President Richard Nixon in 1970 to reorganize the federal bureaucracy to consolidate responsibility for (1) water pollution, (2) air pollution, (3) solid waste management, (4) radiation control, and (5) hazardous and toxic substance control. The EPA is a regulatory agency with power to establish and enforce policy.

The National Environmental Protection Act. In 1970 Congress created the Council on Environmental Quality (CEQ) to advise the president and Congress on environmental matters. The CEQ is an advisory agency. However, the act requires all federal agencies as well as state, local, and private organizations receiving federal monies to file lengthy “environmental impact statements.” If the CEQ wants to delay or obstruct a project, it can ask for endless revisions, changes, or additions in the statement. The CEQ cannot by itself halt a project, but it can conduct public hearings for the press, pressure other governmental agencies, and make recommendations to the president. The courts have ruled that the requirement for an environmental impact statement is judicially enforceable.

The Clean Air Act of 1970. The Clean Air Act of 1970 authorized the EPA to identify air pollutants that cause a health threat and to establish and enforce standards of emission. The EPA began by focusing on automobile emissions, requiring the installation of pollution equipment on all new cars. The EPA ordered lead removed from auto fuel and engines redesigned for lead-free gasoline. It also ordered the installation of emission controls in automobiles. More radical solutions advanced by the EPA (for example, to halt driving in certain cities) were blocked by courts and Congress. The EPA was even more aggressive in pursuing stationary sources of air pollution with requirements for “smokestack scrubbers,” low-sulfur coal, and other costly devices.

The Water Pollution Control Act of 1972. This act stiffened early antipollution laws, but set an unrealistic goal: “that the discharge of pollutants into the navigable waters be eliminated by 1985.” After a flood of lawsuits the EPA was forced to abandon the zero-discharge standard. Forcing municipal governments to clean up their discharges proved more difficult than forcing industry to do so. Many municipalities remain in violation of federal water quality standards.

Endangered Species Act of 1973. This legislation authorizes the U.S. Fish and Wildlife Service to designate endangered species for federal protection and to regulate activities in their “critical habitat.” Initially the law was widely praised as at least partially responsible for the survival of nationally symbolic species such as the bald eagle; but increasingly the law has been used to prevent landowners from using their property in order to protect obscure varieties of rodents, birds, and insects. Today more than 1,000 species are on the endangered species list, and there is virtually no land in the United States on which an endangered species does *not* live. The U.S. Fish and Wildlife Service has the potential to control any land in the nation under the Endangered Species Act.

Wetlands. In 1975 a federal court ruled that the Clean Water Act of 1972 also applied to “wetlands” adjacent to navigable waters. This gave the EPA control over millions of acres of land, estimated to be the equivalent of Ohio, Indiana, and Illinois combined. The result has been a bureaucratic nightmare for owners of land that is classified as wetlands.

Resource Conservation and Recovery Act of 1976. The act authorizes EPA to oversee the nation’s solid waste removal and disposal, including the regulation of landfills, incinerators, industrial waste, hazardous waste, and recycling programs.

Toxic Substances Control Act of 1976. The Toxic Substances Control Act authorized the EPA to designate hazardous and toxic substances and to establish standards for their release into the environment.

The Comprehensive Environmental Response Act of 1980. The Comprehensive Environmental Response Act established a “Superfund” for cleaning up old toxic and hazardous waste sites. Out of 20,000 potential sites, the EPA has placed more than 1,200 on its National Priority List. The act specifies that EPA oversee the cleanup of these sites, assessing costs to the parties responsible for the pollution. If these parties cannot be

found or have no money, then the government's Superfund is to be used. But over the years, cleanup efforts have been seriously hampered by EPA's overly rigid site orders (for example, dirt must be cleaned to the point where it can be safely eaten daily by small children), lengthy lawsuits against previous owners and users (including Little League teams) that divert funds to legal fees, and complicated negotiations with local government over the cleanup of old landfill sites. EPA also enforces "retroactive liability," holding owners liable for waste dumped legally before the law was enacted in 1980. Under current EPA policies, full cleanup of all hazardous waste sites on the National Priority List would cost many billions of dollars, far more than presidents or Congresses are likely to appropriate.

Clean Air Act of 1990. The Clean Air Act Amendments of 1990 enacted many new regulations aimed at a variety of perceived threats to the environment:

Acid rain. Sulfur dioxide emissions must be cut from 20 to 10 million tons annually, and nitrogen oxide emissions must be cut by 2 million tons. Midwestern coal-burning utilities must burn low-sulphur coal and install added smoke-scrubbing equipment at increased costs to their consumers.

Ozone hole. Production of chlorofluorocarbons and hydrochlorofluorocarbons (aerosol sprays, insulating materials) is outlawed, and new regulations are placed on chemicals used in air conditioners and refrigerators.

Urban smog. Additional mandated pollution control equipment is required on new automobiles. Oil companies must produce cleaner-burning fuel. There is also a special requirement that automobile companies produce an experimental fleet of cars to be sold in southern California.

Toxic air pollutants. New definitions and regulations govern more than 200 substances as "toxic air pollutants" released into the air from a wide variety of sources, from gas stations to dry cleaners. The EPA is given authority to require all of these sources to install "the best available control technology" and to provide "an ample margin of safety" for nearby residents.

EPA Regulation of Carbon Dioxide, 2009. The Environmental Protection Agency issued an official finding in 2009 that carbon dioxide is a danger to human health and the environment and therefore subject to EPA regulation under the Clean Air Act. This "endangerment finding" potentially allows the EPA to draw up regulations governing greenhouse gas emissions from electric power plants, refineries, chemical plants, motor vehicles and other sources of emissions, including schools, hospitals, homes and apartment buildings.

Encouraged by the Obama Administration, and relying heavily on studies cited by the International Panel on Climate Change (see above), the EPA issued its finding. Earlier in 2007 the US Supreme Court had held that the Clean Air Act "expressly authorized" the EPA to regulate air "pollutants" and that the EPA itself did not challenge the contention that carbon dioxide was a pollutant.¹²

The threat of EPA regulation of all carbon emissions provides an incentive for Congress itself to act on "cap and trade." The EPA is busy constructing a comprehensive system for reporting emissions of carbon dioxide and other greenhouse gases produced by major sources in the United States. This reporting system may provide the data for comprehensive regulation envisioned by cap and trade.

SUMMARY

Public choice theory views environmental pollution as an externality of human activity. Individuals, firms, and governments frequently impose unwanted costs on others. The environment, especially air and water, is a common-pool resource: access is unrestricted; there are no clearly defined property rights to it; no one has the individual responsibility of caring for it; individuals, firms, and governments tend to use it to carry off waste materials, thus generating unwanted costs or externalities on everyone else. The government has a legitimate interest in managing environmental externalities. Public choice theory offers valuable guidelines in dealing with them.

1. Economic growth is not incompatible with environmental protection. On the contrary, increases in wealth and advances in technology provide the best hope for a cleaner environment.
2. Effective pollution control and risk reduction must be balanced against its costs. Environmental policies whose costs exceed benefits will impair society's ability to deal effectively with environmental problems.
3. The costs of removing additional environmental pollutants and risks rise as we approach zero tolerance. Total elimination of pollutants from air, water, or ground involves astronomical costs and wastes the resources of society.
4. Rational determination of benefits and costs requires scientific evidence. The deliberate rejection of scientific evidence on environmental issues, and the ideological or emotional inspiration to act even in the absence of scientific information, renders cost-effective policymaking impossible.
5. Traditional command and control approaches to environmental protection are less effective than market incentives. Legislatures and bureaucrats that endeavor to devise laws and regulations to reduce pollution are less effective than individuals, firms, and local governments with strong market incentives to reduce pollution in a cost-effective manner.
6. The air and water in the United States are significantly cleaner today than in 1970, when the first major environmental policies were enacted. Improvements in air and water quality have occurred despite growth in the population and growth in waste products.
7. Nonetheless, most Americans believe that pollution is growing worse. Interest group activity and media coverage of environmental "crises," have pushed environmental issues to the forefront of American politics. Predictions of global doom create a climate of opinion that precludes rational analyses of the benefits and costs of environmental policies.
8. Current policy initiatives focus on sulfur dioxide and nitrogen oxide from coal-burning utilities, emissions of ozone and carbon monoxide from automobiles and stationary sources, and toxic air pollutants released from a wide variety of sources.
9. If firms were taxed on the basis of the pollutants they emit, a strong market incentive would be created for a reduction in pollution. A pollution tax would capture the externalities and force producers and consumers to incorporate the full environmental costs of products in the price. It would encourage polluters to find ways themselves to reduce pollution rather than simply comply with government regulations. Waste charges would encourage consumers to reduce their use of waste-producing goods.

Notes

1. *Statistical Abstract of the United States, 2008*, p. 224.
2. Resource Conservation and Recovery Act, PL 94–580, Section 4001 (1976).
3. *Statistical Abstract of the United States, 2008*, p. 225.
4. National Institute of Environmental Health Sciences, March 5, 2002.
5. CBS News/*New York Times* Survey, November 2002, As reported at www.publicagenda.org.
6. Club of Rome, *The First Global Revolution* (New York: Pantheon Books, 1991), p. 115.
7. Christopher Manes, *Green Rage* (Boston: Little, Brown, 1990).
8. Hugh W. Ellsaesser et al., "Global Climate Trends as Revealed by Recorded Data," *Review of Geophysics* 24 (November 1986), 745–792; Patrick J. Michaels and David E. Stooksbury, "Global Warming: A Reduced Threat?" *Bulletin of the American Meteorological Society* 23 (October 1992), 1563–1577; Roy W. Spence and John R. Christy, "Precise Monitoring of Global Temperature Trends from Satellites," *Science* 247 (March 1990), 1558–1562.
9. International Panel on Climate Change, *Fourth Assessment Report: Climate Change 2007*, www.ipcc.ch.
10. Al Gore, *Earth in the Balance* (Boston: Houghton Mifflin, 1992).
11. U.S. Department of Energy, *Annual Energy Review 2008*, www.eia.doe.gov.
12. *Massachusetts v. EPA*, April 2, 2007.

Bibliography

- BLOCK, BEN, and HAROLD LYONS. *Apocalypse Now: Science, Economics, and Environmentalism*. Washington, DC: CATO Institute, 1993.
- GORE, AL. *Earth in the Balance*. Boston: Houghton Mifflin, 1992.
- KRAFT, MICHAEL E. *Environmental Policy and Politics*, 4th ed. New York: Longman, 2007.
- LIPSCHUTZ, RONNIE D. *Global Environmental Politics*. Washington, DC: CQ Press, 2003.
- ROSENBAUM, WALTER A. *Environmental Politics and Policy*, 7th ed. Washington, DC: CQ Press, 2007.
- VIG, NORMAN J., and MICHAEL E. KRAFT. *Environmental Policy*, 6th ed. Washington, DC: CQ Press, 2005.

Web Sites

- U.S. ENVIRONMENTAL PROTECTION AGENCY. Official Web site of the EPA, with laws, regulations, key issues, press releases, etc. www.epa.gov
- U.S. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION. Official Web site of NOAA, with information on weather, climate, atmospheric research, etc., as well as real-time satellite imagery. www.noaa.gov
- ENVIRONMENTAL DEFENSE FUND. Advocacy organization for environmental programs and spending. www.environmentaldefense.org
- GREENPEACE. Home page of militant environmental organization opposed to world trade, whaling, fishing, deforestation, etc. www.greenpeace.org
- NATIONAL WILDLIFE FEDERATION. Home page of moderate organization supporting wildlife conservation and environmental education. www.nwf.org

SIERRA CLUB. Advocacy organization for environmental protection, with information on issues, press releases, and voting records of Congress members. www.sierraclub.org

NATURAL RESOURCE DEFENSE COUNCIL. Advocacy organization that relies mainly on lawsuits to advance goals in clean air, clean water, nuclear waste, etc. www.nrdc.org

COMPETITIVE ENTERPRISE INSTITUTE. Advocacy organization opposed to centralized command approaches to environmental protection and favoring competitive free enterprise approaches. www.cei.org

INTERNATIONAL PANEL ON CLIMATE CHANGE, *UN-Spanned organization given responsibility for assessing global warming.* www.ipcc.ch.

NUCLEAR ENERGY INSTITUTE. News and information from the nuclear power industry, www.nei.org.