

# *Public Policies for Environmental Protection*

## **INTRODUCTION**

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# Public Policies for Environmental Protection, 2nd Edition

## INTRODUCTION

by

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In the decade that has passed since the appearance of the first edition of *Public Policies for Environmental Protection*, significant changes have occurred in U.S. environmental policies, related policy debates, and the context in which they have occurred. Here we briefly review these policy developments and describe how the book has evolved to reflect them. We also describe the scope and level of the book, and highlight ways in which it can be used as a complement to texts and other readings in the science, economics, and politics of the environment. Finally, we provide brief previews of the book's chapters.

### 1. Environmental Policy Developments and Trends Since the Previous Edition (1989)

Six trends, of varying importance, stand out. First, there has been greatly increased interest in market-based instruments for environmental protection, as evidenced by the creation of the sulfur dioxide (SO<sub>2</sub>) allowance trading program in the Clean Air Act Amendments of 1990. Second, there has been a proliferation of information provision programs, such as in the expansion of the Toxic Release Inventory. Third, there has been a moderate expansion in the use of benefit-cost analysis under several environmental statutes and executive orders. Fourth, distributional issues on both the benefit and cost sides of the regulatory equation have gained heightened attention, often under the rubric of "environmental justice." Fifth, concerns about global climate change have emerged as an important focal point of many policy debates. Sixth and finally, there has been an upsurge of recycling activity and a related new focus of federal waste management policy.

#### 1.1 Market-Based Instruments

The most striking change that has taken place since the first edition of this book is with regard to the employment of economic-incentive or market-based environmental policy instruments, approaches that encourage behavior through market signals rather than through explicit directives regarding pollution control levels or methods. These policy instruments, such as tradable permits, pollution charges, and deposit-refund systems, are often characterized as "harnessing market forces" because if they are well designed and implemented, they encourage firms (and/or individuals) to undertake pollution control efforts that are in their own interests and that collectively meet policy goals. In political terms, market-based instruments have by

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now moved center stage, and policy debates look very different from the time when these ideas were characterized as “licenses to pollute” or dismissed as impractical. Indeed, they often seem to have become a new conventional wisdom among policy makers in the environmental realm, at least in the United States.

In 1989, the Federal government set up a tradable permit system and levied an excise tax on specific chloroflourocarbons to meet international obligations established under the Montreal Protocol to limit the release of chemicals that deplete stratospheric ozone. One year later, the U.S. Environmental Protection Agency (EPA) began to allow averaging, banking, and trading of credits for nitrogen oxide (NO<sub>x</sub>) and particulate emissions reductions among eleven heavy-duty truck and bus engine manufacturers. Also enacted in 1990 was the most important application ever made of a market-based instrument for environmental protection: the tradable permit system intended to reduce SO<sub>2</sub> emissions by 10 million tons below 1980 levels. A robust market of bilateral SO<sub>2</sub> permit trading gradually emerged, resulting in cost savings on the order of \$1 billion annually (Carlson, Burtraw, Cropper, and Palmer 2000). Subsequently, twelve northeastern states and the District of Columbia implemented under EPA guidance a regional nitrogen oxide (NO<sub>x</sub>) cap-and-trade system. Potential compliance cost savings of 40 to 47 percent have been estimated for the period 1999-2003 (Farrell *et al.* 1999).

In addition, there has been considerable action with market-based instruments at the state and local level. The South Coast Air Quality Management District (SCAQMD), which is responsible for controlling emissions in a four-county area of southern California, launched a tradable permit program in January, 1994, to reduce nitrogen oxide and sulfur dioxide emissions in the Los Angeles area. One prospective analysis predicted 42 percent cost savings, amounting to \$58 million annually (Anderson 1997). Also since 1989, California, Colorado, Georgia, Illinois, Louisiana, Michigan and New York have established NO<sub>x</sub> and VOC emissions credit programs, authorized under the U.S. EPA Emissions Trading Program framework (Bryner 1999).

## **1.2 Information Programs**

Over the past decade, there has been a proliferation of information-based environmental policies. Most prominently, the U.S. Toxics Release Inventory (TRI), mandated in 1986 under the Emergency Planning and Community Right-to-Know Act, requires firms to report to local emergency planning agencies information on use, storage, and release of hazardous chemicals. Such information reporting serves compliance and enforcement purposes, but may also increase public awareness of firms’ actions, which can encourage firms to alter their behavior, although the evidence is mixed (Konar and Cohen 1997; Hamilton and Viscusi 1999).

The U.S. Energy Policy and Conservation Act (EPCA) of 1975 requires that some household appliances carry labels with information on energy efficiency and estimated annual energy costs, and that new cars carry labels indicating fuel efficiency. The Energy Policy Act of 1992 added fluorescent and incandescent lamps to the list of products requiring labels, and it expanded the EPCA labeling requirements to include water flow information for showerheads, faucets, and toilets. Since 1996, EPA also requires uniform labeling of certain types of rechargeable batteries (U.S. Environmental Protection Agency 2000).

Notification requirements extend to the public sector, as well. The 1996 Amendments to the Safe Drinking Water Act (SDWA) require all community drinking water systems to mail to each customer an annual report containing information about source water quality and the levels of various contaminants.

### 1.3 Expanded Use of Benefit-Cost Analysis

Although there has not been a dramatic increase in the use of benefit-cost analysis in environmental regulation since the first edition of this book was published,<sup>2</sup> it is also true that the use of benefit-cost analysis has been expanded by Presidential executive orders and legislation. Presidents Carter, Reagan, Bush, and Clinton all introduced formal processes for reviewing economic implications of major environmental, health, and safety regulations. In 1993, President Clinton replaced Executive Orders 12291 and 12498, issued by President Reagan, with Executive Orders 12866 and 12875, whereby regulation is considered appropriate only upon “reasoned justification that benefits justify costs,” and benefit-cost analysis is required for all “significant regulatory actions.”

Congress has supported requirements for benefit-cost analysis only in selected contexts. Section 812 of Title VII of the Clean Air Act Amendments of 1990 requires EPA to conduct a comprehensive analysis of the retrospective benefits and costs of the Clean Air Act from 1970 to 1990, in addition to biennial analyses of the benefits and costs of the 1990 Amendments, which must include future projections. EPA issued its final retrospective report in October 1997, following six years of controversial development and review. The Agency’s first prospective report, covering the period 1990-2010, was released in November 1999 (U.S. Environmental Protection Agency 1999).

The 1996 amendments to the Safe Drinking Water Act allow EPA to consider overall risk reduction when setting standards and direct EPA to conduct benefit-cost analyses for new regulations. Further, the amendments allow EPA to adjust maximum contaminant levels in light of the results of benefit-cost analysis. More broadly, Congress enacted in 1995 the Unfunded Mandates Reform Act, which requires quantitative comparison of benefits and costs for all proposed and final rules, including environmental regulations, with an expected annual cost greater than or equal to \$100 million. In addition, the Act mandates that agencies choose the least-cost regulatory alternative, or explain why the least-cost alternative was not chosen, but evidence indicates that these benefit-cost policies have had only limited effects on agency rule making (U.S. General Accounting Office 1998; Hahn *et al.* 2000).

Distributional concerns have long been the focus of political debates, and in recent years have become an explicit element in required economic analyses. Clinton’s Executive Orders require examination of “distributive impacts” and “equity.” In 1994, Executive Order 12898 formalized the President’s position by instructing Federal agencies to identify and address “disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” In addition, the Small Business Regulatory Enforcement Fairness Act of 1996 requires EPA

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<sup>2</sup>The Flood Control Act of 1936 may include the first legislative mandate to use benefit-cost analysis. Since then, several statutes have been interpreted as restricting the ability of regulators to consider benefits and costs, while others clearly require regulators to consider benefits and costs (Arrow *et al.* 1996).

(and other affected agencies) to prepare regulatory flexibility analysis of all rules with “significant economic impact” on a “substantial number” of small entities (businesses, non-profits, and small government organizations).

#### **1.4 Global Climate Policy**

In 1989, there was little serious attention by U.S. government agencies to the possibility of global climate change, due to the greenhouse effect, linked primarily with the combustion of fossil fuels. Times have changed. Partly as a result of pronouncements by the United Nations-chartered Intergovernmental Panel on Climate Change, this problem is taken much more seriously today than it was five years ago, let alone a decade past. Although by the summer of 2000 the United States has not ratified (and appears unlikely to ratify in the near future) the Kyoto Protocol — the international agreement establishing reduction targets for carbon dioxide (CO<sub>2</sub>) and other greenhouse gases — a considerable amount of high-level policy discussion and legislative consideration increasingly focuses on this issue.

#### **1.5 Recycling and Federal Waste Management Policy**

Since 1990, there has been a significant increase in recycling activity in the United States and a related shift in emphasis of Federal waste management policy. For example, President Clinton’s 1993 Executive Order 12873 requires Federal agencies to purchase only recycled copy paper, and the 1996 Mercury-Containing and Rechargeable Battery Management Act initiated a national voluntary take-back system for rechargeable batteries (in other words, those selling these batteries must accept them for disposal at the end of their useful life). States and municipalities have also moved forward on these issues. Through the mid-1990’s, 16 states had some form of recycling investment tax credit, nine states had deposit-refund systems for beverage containers, and 13 states had established standards for the recycled content of newsprint. At the local level, nearly 4,000 U.S. communities now levy user charges, often called pay-as-you-throw or unit-based pricing, on municipal solid waste, a substantial change from zero prices, which are still the overall norm (Miranda *et al.* 1998).

### **2. Scope, Level, and Audience**

Over the past ten years, there has been a proliferation of environmental economics and environmental science text books, and there are an increasing number of texts that focus on environmental politics. Even the best of these texts, however, cannot (and are not intended to) provide timely surveys of the state of environmental policy. But this is precisely the purpose of this book, which can serve as an effective complement for a wide variety of texts in environmental economics, environmental science, and environmental politics courses, and can likewise serve as a central source for courses in environmental policy.

The book should be useful for a diverse set of practitioners, as well as students at all levels. A central criterion used in editing the selections has been the notion that chapters should not only be sound, original, and well written, but also nontechnical, and hence broadly accessible. In order to address the

important developments and trends reviewed above, the current edition introduces four new chapters: market-based instruments; global climate policy; hazardous waste and toxic substance policies; and solid waste policy. The book also includes fully updated versions of three other chapters: the evolution of Federal environmental regulation; air pollution policy; and water pollution policy. Together these changes have resulted in what is fundamentally a new book, and one that reflects the current state of U.S. environmental policy and the results of the current state of the art in analyzing such policy.

A few words about the scope of the book are in order. We focus exclusively on public policies in the environmental realm, chiefly those that reduce concentrations of pollution, as opposed to those that operate in the natural resources realm and achieve various goals of resource management. This means, for example, that whereas various types of public policies to reduce air and water pollutant emissions are reviewed, tradeable development rights, wetlands mitigation banking, and tradeable permit systems used to govern the allocation of fishing rights are not considered. The distinction between environmental and natural resource policies is sometimes arbitrary, but it is generally a useful distinction that will match with the defined scope of many courses and the interest areas of many practitioners.

### **3. Highlights of the Chapters**

Following this introduction, the book consists of seven additional chapters which span the scope of U.S. environmental policy. Following two chapters on over-arching issues, EPA and the Evolution of Regulation, and Market-Based Environmental Policies, successive chapters examine: Air Pollution Policy, Climate Change Policy, Water Pollution Policy, Hazardous Waste and Toxic Substances Policies, and Solid Waste Policy.

In Chapter 2, Paul Portney examines the justification for Federal intervention in environmental, health and safety regulation, and reviews the evolution of Federal regulation in the United States. He outlines the creation and growth of the U.S. Environmental Protection Agency from 1970 to the present, and assesses two alternatives to conventional environmental regulation: legal liability and private negotiation/mediation. Portney also considers the challenges of designing Federal intervention (deciding when to intervene, through which level of government, and in pursuit of how much protection from risk), choosing the means of attainment of environmental standards (on a scale from direct, centralized regulation to incentive-based, decentralized regulation), and monitoring for compliance. The chapter considers how these challenges have resulted in a hybrid approach to environmental regulation. In closing, Portney highlights problems facing EPA in an era of complex environmental laws, high expectations, emphasis on redistributive goals, and complicated and expensive monitoring.

In Chapter 3, Robert Stavins begins by recognizing that nearly all environmental policies consist of two components: the identification of an overall goal and some means to achieve that goal. The chapter focuses exclusively on the second component, the means — the “instruments” — of environmental policy, and considers, in particular, economic-incentive or market-based policy instruments. Stavins notes that it was some eighty years ago that economists first proposed the use of corrective taxes to internalize environmental and other externalities. Fifty years later, the portfolio of potential economic-incentive

instruments was expanded to include quantity-based mechanisms — tradeable permits. Thus, economic-incentive approaches to environmental protection are clearly not a new policy idea, and over the past two decades, they have held varying degrees of prominence in environmental policy discussions. The chapter provides a comprehensive review of U.S. experiences with such market-based policy instruments, including: pollution charges; deposit-refund systems; tradeable permits; market barrier reductions; and government subsidy reductions.

In Chapter 4, Paul Portney provides a detailed review and assessment of U.S. air pollution policy. He describes the structure of the Clean Air Act, including the important series of amendments that have characterized its evolution over thirty years, and reviews trends in air quality in the United States. As a means of providing an assessment of the Clean Air Act and its amendments, he reviews the growing body of empirical evidence on the benefits that have been produced by the statute and the costs that have thereby been incurred. Finally, Portney reviews a variety of important and timely topics where economic thinking and economic analysis can contribute to informed discussion and debate.

The subject turns to global climate change policy in Chapter 5. Jason Shogren and Michael Toman discuss the most important policy developments. The authors begin with a review of current knowledge on the possible causes and extent of global climate change, as well as its potential physical and socioeconomic consequences. They also offer a chronology of policy and institutional responses to climate change, including international approaches and U.S. policy developments. Shogren and Toman go on to explore the costs and benefits of climate change risk mitigation, and they discuss alternatives to a benefit-cost analysis framework. They emphasize throughout the complications of estimating the benefits and costs of avoiding damages from climate change, as well as the potential value of waiting for more and better information before incurring significant costs. The authors outline some important considerations in the design of climate change policies and the choice of policy instruments, and they emphasize the need for a stable, coherent international climate change policy architecture, in addition to sound domestic policies.

In Chapter 6, Myrick Freeman reviews the history and evolution of Federal water pollution control policy, highlighting issues that have directed policy toward greater Federal responsibility over time for standard-setting, implementation, and financing. Freeman appraises the key features of the Federal Water Pollution Control Act of 1972 that have defined the contemporary approach to water policy, as well as revisions to that framework by the 1977, 1981 and 1987 amendments and by related statutes. He reviews accomplishments in water effluent discharge control and water quality improvements, to the extent that these can and have been measured. Finally, he compares the costs and benefits of water pollution control policy, considers relative cost-effectiveness, and uses his analysis to evaluate two policies: Federal subsidies for municipal sewage treatment plants, and the evolving Federal approach to nonpoint source water pollution control.

In Chapter 7, Hilary Sigman considers two related sets of Federal environmental policies: hazardous waste and toxic substances regulation. She begins with an overview of hazardous waste management methods and recent trends in hazardous waste management, including treatment, storage and disposal prices, disposal quantities and methods, and total waste generation. Sigman analyzes the likely impact of the Federal Resource Conservation and Recovery Act (RCRA) on these trends, and assesses

RCRA's provisions in a benefit-cost framework. She comments on the recent focus on distribution of impacts across households of various racial and economic groups. Sigman also reviews regulations regarding cleanup of contaminated sites, primarily RCRA's Corrective Action and Superfund, as well as debates over who should pay for cleanup and "how clean is clean," that is, the appropriate scale of contaminated site remedies. In her discussion of Federal policies to control general exposure to toxic substances, Sigman examines the Toxic Substances Control Act (TSCA), the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), and the Emergency Planning and Community-Right-to-Know Act (EPCRA). She focuses on the Toxic Release Inventory (TRI), created by EPCRA in 1986, examining the question of whether it has contributed to the observed decline in toxic chemical releases.

Finally, Molly Macauley and Margaret Walls review Federal solid waste policies in Chapter 8. They describe the composition of municipal solid waste in the United States, its generation, and its regulation. They discuss the rationale for such regulation, identify specific externalities, and suggest corrective mechanisms, with cost-effectiveness as one important criterion. Macauley and Walls appraise other potential goals of solid waste policies, such as resource conservation, meeting demand for secondary materials, reducing GHG emissions, and addressing life-cycle externalities. They find, however, that solid waste policy should not attempt to address these concerns directly. They conclude by suggesting that pricing solid waste collection and disposal directly can be a first-best solution for market failures in solid waste management, if illegal disposal is not a serious problem, and that among alternative (second-best) policies, deposit-refund systems may reduce waste disposal at least cost.

#### **4. An Invitation to Readers**

As we emphasized at the outset, environmental policy is very much a moving target. Furthermore, from different vantage points there will be differing views of what would be the most useful level and the most appropriate scope for a book such as this. Hence we invite all readers of this edition of *Public Policies for Environmental Protection*, whether practitioners, teachers, or students, to send us or the publisher any thoughts or suggestions for future editions. We intend to keep this book as up to date as is permitted by that scarcest of contemporary scarce resources, time.

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