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0521660831 - Markets for Clean Air: The U.S. Acid Rain Program

A. Denny Ellerman, Richard Schmalensee, Elizabeth M. Bailey, Paul L. Joskow and Juan-Pablo Montero

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Markets for Clean Air

Markets for Clean Air provides a comprehensive, in-depth description and evaluation of the first three years' experience with the U.S. Acid Rain Program. This environmental control program is the world's first large-scale use of a tradable emission permit system for achieving environmental goals. The book analyzes the behavior and performance of the market for emissions permits, called allowances in the Acid Rain Program, and quantifies emission reductions, compliance costs, and cost savings associated with the trading program. The book also includes chapters on the historical context in which this pioneering program developed and the political economy of allowance allocations. Finally, the book discusses the program's successes, its weaknesses, and the lessons learned regarding application of the emissions-trading approach to controlling other types of emissions, including greenhouse gases. The volume is an indispensable addition to the library of all interested in the application of market principles for meeting environmental goals.

A. Denny Ellerman is Senior Lecturer at the Sloan School of Management, Massachusetts Institute of Technology (MIT), and Executive Director of MIT's Center for Energy and Environmental Policy Research (CEEPR). Dr. Ellerman specializes in the economics of energy with a particular interest in the American coal industry. He was an executive vice president of the National Coal Association during most of the time that acid rain legislation was being debated in the U.S. Congress.

Paul L. Joskow is Elizabeth and James Killian Professor of Economics and Management, Department of Economics and Sloan School of Management at MIT, and Director of the CEEPR. Professor Joskow specializes in the economics of government regulation, industrial organization, and competition policy. He has published two books and numerous articles on economic and regulatory issues related to the electric power industry. He was a member of the Environmental Protection Agency's Acid Rain Advisory Committee and is currently a member of the EPA's Science Advisory Board.

Richard Schmalensee is Gordon Y. Billard Professor of Economics and Management, Dean of the MIT Sloan School of Management, and former Director of CEEPR. Dean Schmalensee specializes in industrial economics, regulation and antitrust, and environmental policy analysis. He served as a member of President Bush's Council of Economic Advisers during development of the 1990 Clean Air Act Amendments and was heavily involved in the design of the Acid Rain Program.

Juan-Pablo Montero is Associate Professor of Industrial Economics in the Department of Industrial Engineering at the Catholic University of Chile, and CEEPR Research Associate. Professor Montero specializes in industrial organization and environmental economics and policy. He has been involved in CEEPR's Title IV research from the beginning and devoted his doctoral dissertation at MIT to emissions trading.

Elizabeth M. Bailey is a consultant at National Economic Research Associates, Inc., Washington, D.C. Dr. Bailey's research as a graduate student in the Economics Department of MIT and a Research Associate at CEEPR concerned the analysis of the U.S. Acid Rain Program during its formative stages.

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Markets for Clean Air

The U.S. Acid Rain Program

A. DENNY ELLERMAN

*Massachusetts Institute of
Technology*

RICHARD SCHMALENSEE

*Massachusetts Institute of
Technology*

ELIZABETH M. BAILEY

*National Economic Research
Associates, Inc.*

PAUL L. JOSKOW

*Massachusetts Institute of
Technology*

JUAN-PABLO

MONTERO

Catholic University of Chile



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“If it is feasible to establish a market
to implement a policy, no policy-maker
can afford to do without one.”

—J. H. Dales, *Pollution, Property, and Prices*

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Preface

This book brings together the results of more than five years of research conducted by the Center for Energy and Environmental Policy Research at the Massachusetts Institute of Technology, with which all of the authors have been affiliated. The Center seeks to provide rigorous, empirically grounded, and accessible economic analysis to inform the public policy debate. It has been the focus of applied economics research on energy and environmental issues at MIT for more than twenty years. The Center historically has concentrated on topics – like emissions trading – that are both interesting to academics and relevant to policymakers and industry analysts. Market-based emissions control instruments are increasingly in vogue, and we are pleased to provide this evaluation of the remarkable public policy experiment with emissions trading that was initiated by Title IV of the 1990 Clean Air Act Amendments, the U.S. Acid Rain Program. We hope that our research will contribute to the consideration of market-based systems as tools for meeting at least some demands for environmental amenities.

As is the case for any major endeavor, there is a long list of people without whose assistance this book would never have appeared. This research has grown out of the inspired suggestion and accompanying funding by the National Acid Precipitation Assessment Program (NAPAP), which initially encouraged us to combine our collective experience to provide an evaluation for NAPAP's Quadrennial Report to the U.S. Congress. Particular thanks for encouragement and support during the early years are due to NAPAP's director,

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Michael Uhart, and to Rodney Weiher, chairman of NAPAP's Economics Working Group.

This book also could not have been written without assistance from the Acid Rain Division of the U.S. Environmental Protection Agency (EPA), to which we are indebted in three important ways. First, were it not for the rare vision and dedication of this group of civil servants in making Title IV a successful market-based emissions control system, the subject of this book would not have been nearly as interesting academically, nor as informative for public policy. Second, the cooperation of the Division in providing data and responding to endless questions for clarification and explanation has been extraordinary. Finally, the Division continued the financial support of our work that was begun by NAPAP. We have benefited from interactions with many people in the Division over the years, but three deserve special recognition and thanks: Brian McLean, Joe Kruger, and Larry Montgomery.

The lifeblood of the type of research reported here is data, and three other organizations have been especially helpful in supplying us with this necessity. Carlton Bartels of Cantor Fitzgerald Environmental Brokerage Services has provided data on allowance prices, particularly with respect to future vintages, that are not available anywhere else. Fieldston Publications has provided historical data on coal prices and sulfur premiums, for which thanks are due Peter Ogram. Finally, as with all topics concerning energy, we have relied heavily on the Energy Information Administration for data on coal deliveries and other aspects of power plant operations; thanks are due to Art Fuldner and Kenneth McClevey.

We have also benefited greatly from perspectives provided by a number of industry participants in Title IV abatement and SO₂ allowance trading. In particular, we express our thanks to the electric utilities and unnamed utility employees who took the time to respond to the survey questionnaire on Title IV abatement costs that we circulated in 1996. Their responses were essential to developing the cost estimates reported here. Over the years, we have also engaged in a continuing dialogue with a number of industry participants who invariably have provided interesting hunches, insights, and facts. In particular, we wish to recognize the contributions of Lynda Clemmons and Tom Gros of Enron Capital and Trade Resources Corporation, Richard Chastain and Gary Hart of the Southern

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Company, Jerry Golden of the Tennessee Valley Authority, and John McManus of American Electric Power.

A number of our colleagues at other universities and research groups have contributed in ways too complex to explain, and we hope that they will consider this book a further contribution to the ongoing dialogue. Particular thanks are due Robert Stavins of Harvard University, Jeremy Platt of the EPRI, Dallas Burtraw of Resources for the Future, Tom Tietenberg of Colby College, and Richard Morgenstern, now with the U.S. Department of State. Robert Brenner of EPA's Office of Air and Radiation, Robert Hahn of the American Enterprise Institute, and Karl Hausker of the Center for Strategic and International Studies, all of whom helped to create the Acid Rain Program, were also helpful in this research.

The real work in the research effort behind this book was performed by a number of research assistants, two of whom, Montero and Bailey, co-authored this book and a third, Susanne Schennach, contributed the appendix. Amy Ando, Estelle Andrin, Paul Ellickson, Yan Giao, and Sung Kim also made significant contributions, for which we are grateful.

Production of this book would not have been possible without Judith Stitt's meticulous attention to detail and the unflagging and cheerful effort of Heather Mitchell in harnessing recalcitrant computers and assembling text, tables, graphs, and references into one coherent manuscript. Words cannot express our gratitude for being freed from these tasks.

Lastly, our spouses and families have had to be more than usually forbearing during the preparation of this book. To them, as well as to everyone else who has helped us, we express heartfelt thanks and appreciation. The book's flaws are not their fault.

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