

## FROM THE PRESIDENT...

AERE makes its greatest contribution to its members by providing a number of forums for debate of environmental and resource economics issues. This includes the selection of a portfolio of sessions on these topics at the Allied Social Science Associations (ASSA) meetings in January and the summer meetings of the American Agricultural Economics Association (AAEA). It also includes the uniquely AERE experience, the annual AERE workshop. Information on these events can be found in this newsletter, but here I'd like to pass on the highlights and recognize those who have done the hard work.

- **In June, AERE held a special edition of its annual workshop in Cambridge, Massachusetts on the topic of market-based instruments.** The workshop was "special" in many ways. Co-sponsored by the Harvard Committee on the Environment and the Kennedy School of Government, the workshop organizers accommodated a record number of participants (175) and paper submissions (140). Perhaps the most popular session was the panel discussion on what we know and don't know about tradeable permit systems. Its success has led many to argue for a panel discussion of experts as a regular addition to our annual workshops. (Unarguably, a second highpoint of the workshop was the dinner at the Harvard Faculty Club!) Once again, our thanks go to Rob Stavins, who made the joint venture possible and who shouldered most of the burden, to Marelu Justus and Jo-Ann Mahoney, who handled the logistics flawlessly, to the program committee for reading the 140 submissions and agreeing on a final program of 14 papers, and to the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of the Interior, Fish and Wildlife Service (FWS), and the U.S. Department of Agriculture, Economic Research Service (ERS), for supplying the funds AERE draws on to make these workshops possible.

- **The AERE Workshop of Summer 2000 moves to the west coast this year to La Jolla, California.** The size of the workshop returns to its traditional smaller scale of about 80. This year's topic will be: what determines the effectiveness of resource and environmental regulation? Peter Berck is chairing this year's

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**Enclosure: Luncheon Reservation Form**

committee, aided by John Beghin, Iowa State University, John Charbonneau, FWS, Carol A. Jones, ERS, Norman Meade, NOAA, and Laura Taylor, Georgia State University. A Call for Papers was mailed to all current members of AERE last month. See additional details on page 5.

• **Plans are now nearly complete for the annual ASSA meetings being held in Boston.** Given the level of interest shown in market-based incentives at the 1999 AERE Workshop, the AERE invited papers session at the ASSA meetings in Boston will revisit this timely topic. The jointly-sponsored AERE-AEA session will address another particularly timely question: "Does Retrospective and Prospective Benefit Cost Analyses Improve Environmental Policy?" AERE will sponsor six additional sessions that are reported on page 8. Anna Alberini has taken over as chair of the program committee that selected papers and assembled sessions for the ASSA meetings as well as those at the AAEA meetings in Nashville this past summer. This is an enormous job that she handled with Heidi J. Albers, Larry Goulder, and George Parsons. Please make a special point of attending as many of the sessions in

Boston as interest you; the AEA is watching, and our future session allotment will be figured as a function of current attendance. Also, please join us for the AERE luncheon which serves as our general meeting. This year special arrangements were made with the four-star Four Seasons Hotel. The reservation form—enclosed in this newsletter—must be returned by December 20th.

• **The best is saved for last...planning is well underway for the World Congress of Environmental and Resource Economists in 2002, and this time AERE will be the host.** Co-chairs Chuck Howe and Peter Parks prepared a request for proposals to host the Congress and assembled a selection committee to review the seven excellent and detailed proposals that were submitted. Details are reported by the committee on page 4, but the bottomline is this: the next World Congress will be held in Monterey, California, in June 2002. While Monterey is not Venice, it has its own very special appeal and we believe this Congress will be even more successful than the first. To make it happen will take a good deal of work. Anyone who is interested in participating, please let Chuck, Peter, or me know. A number of committees (program, host, fundraising, etc.) will need willing members both from our ranks and those of the European Association of Environmental and Resource Economists (EAERE).

Planning for a second World Congress is especially meaningful as AERE and EAERE continue their increasing cooperation. This year we introduced a joint offer for calendar year 2000 members. EAERE members have been offered a secondary membership in AERE with full benefits at half price. Likewise, AERE members have the opportunity to join EAERE at half price. We hope this offer adds to the value of membership in both associations and encourages a more global forum for environmental and resource economics work.

In AERE's 20<sup>th</sup> year, the association is now 900 strong and still growing. Please remember to renew your membership this fall.

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## AERE Newsletter

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## AERE ANNOUNCEMENTS

### AERE SPECIAL EDITION WORKSHOP 1999

On July 18-20, 1999, a special edition of the annual AERE Workshop on "Market-Based Instruments for Environmental Protection" was held at Harvard University in Cambridge, Massachusetts. A complete list of papers presented at the workshop can be found in the May 1999 issue of the AERE Newsletter. Selected papers are posted with the permission of the authors and are downloadable as pdf files at:

<http://www.ksg.harvard.edu/bcsia/enrp/wkshp.htm>

#### Workshop Chair:

Robert N. Stavins, John F. Kennedy School of Government, Harvard University

#### Paper Selection Committee:

John Beghin, Iowa State University  
Peter Berck, University of California, Berkeley  
Dallas Burtraw, Resources for the Future  
Lawrence Goulder, Stanford University  
Robert Hahn, American Enterprise Institute  
Hilary Sigman, Rutgers University  
Robert Stavins, Harvard University  
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#### Sponsor Delegates:

Norman Meade, National Oceanographic Atmospheric Administration  
John Charbonneau, Fish and Wildlife Service

#### Workshop Coordinators:

Marelu Justus and Jo-Ann Mahoney

#### Workshop Sponsors:

AERE  
John F. Kennedy School of Government  
Harvard University Committee on Environment

AERE sponsorship of workshops is funded, in part, by the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of the Interior, Fish and Wildlife Service, and the U.S. Department of Agriculture, Economic Research Service.

### BOARD OF DIRECTORS' MEETING

The annual meeting of the AERE Board of Directors will be held on Friday, January 7<sup>th</sup> from 5:30 to 7:30 p.m. at the Sheraton Boston Hotel in the Kent Room. Anyone with matters to be brought before the Board should contact the president:

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### DIRECTORY AND HANDBOOK

The *AERE Directory* and the *AERE Handbook* are now available in electronic form. We have moved from hard-copy to electronic publication and distribution to save printing and postage costs, and to provide members with a more current directory with quarterly updates.

Both documents are provided as downloadable Adobe Acrobat 3.0 PDF files. The download site is: <http://www.rff.org/~aere>. If you do not have an Adobe Acrobat 3.0 reader, one may be obtained free of charge from Adobe by following the link provided in the site. Additional instructions for downloading the documents are also provided on the site. The directory and the handbook are password protected to prevent unauthorized downloads. All current members of AERE have been mailed a letter that contains the password.

If you have any comments on the electronic distribution of these documents, or experience any trouble with the site, please send me an e-mail or contact Marilyn Voigt, AERE executive secretary, in the AERE business office by e-mail: [voigt@rff.org](mailto:voigt@rff.org) or telephone: 202-328-5077. Thanks.

**Ray Kopp**  
**Treasurer**  
**[kopp@rff.org](mailto:kopp@rff.org)**

## EAERE SECONDARY MEMBERSHIP

Individuals who are members of AERE in 2000 are eligible for a secondary membership in the EAERE for 2000 for just half the usual price of membership (and free for AERE members under the age of 30!). Benefits of secondary membership in EAERE include:

- A substantial discount to EAERE conferences and World Congresses organized by EAERE and AERE jointly;
- Reduced subscription rates for *Environmental and Resource Economics*, the journal published by Kluwer Academic Publishers, and *Resources Policy* published by Elsevier;
- The right to vote in EAERE's General Assembly and for the EAERE president and Council.

Forms for this special arrangement will be sent to all AERE members.

## HOME PAGE

AERE can be found on the world wide web at:

<http://www.aere.org>

(Note: There have been no changes to the AERE server. The AERE home page can also be found at [http://www.ecu.edu/econ/aere/.](http://www.ecu.edu/econ/aere/))

The AERE Home Page is a valuable resource. It provides information about membership, the *Journal of Environmental Economics and Management (JEEM)*, a list of AERE members with web pages, the on-line edition of excerpts from the *AERE Newsletter*, graduate programs in environmental and resource economics, meetings and workshops, job opportunities, on-line discussion lists, and WWW links of interest. Send any and all comments to:

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For AERE membership information, including application forms, see the AERE Home Page at: [www.aere.org](http://www.aere.org). For inquiries about subscriptions to *JEEM* or other matters, please contact: Marilyn M. Voigt, AERE Executive Secretary, [voigt@rff.org](mailto:voigt@rff.org); Telephone: 202-328-5077.

## PUBLICATION DISCOUNTS

Through special arrangements with Cambridge University Press and North-Holland Press, 20% discounts on *Environment and Development Economics* and *Resource and Energy Economics* are being offered to AERE members who wish to subscribe to these journals. In addition, Resources for the Future (RFF) offers 20% discounts on all its publications to members of AERE. For more information, see the Publications section of the Bulletin Board on page 26 in this issue.

## WORLD CONGRESS OF ENVIRONMENTAL AND RESOURCE ECONOMISTS

In late June 2002, the second World Congress of Environmental and Resource Economists will be held in Monterey, California. The site was selected after careful consideration from among a list of excellent candidates. The committee responsible for this choice included representatives from AERE and the European Association of Environmental and Resource Economists (EAERE).

Committee members included Chuck Howe and Peter Parks (co-chairs), Janie Chermak, Frank Convery, Michael Hanemann, Gabriel Lozada, Dean Lueck, Ari Michelsen, J.R. de Shazo, and Elizabeth Wilman.

Additional announcements, including calls for papers, will appear in future AERE Newsletters.

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## CALLS FOR PAPERS

### AERE WORKSHOP 2000

#### Effectiveness of Resource and Environmental Regulation

**June 11-13, 2000**  
**Scripps Institute of Oceanography**  
**La Jolla, California**

The next AERE Summer Workshop will be held at the Scripps Institute of Oceanography from 12 noon on June 11 to 12 noon on June 13, 2000, in La Jolla, California. It will focus on theoretical and empirical work that is drawn from many economic perspectives and illustrative of a variety of regulatory problems in developed and developing countries. Suggested topics for papers include: What makes a regulation effective? How does one know that a regulation has been effective? Which regulations or types of regulations have been effective?

There are many ways to approach these questions, including: mechanism design; the use of laboratory experiments; measuring the effectiveness of and/or need for monitoring and enforcement; developing the theoretical efficacy of command-and-control versus market-based policies in meeting environmental goals; conducting longitudinal or retrospective studies relating environmental quality to control efforts; and developing political-economic models that can help explain the effectiveness/ineffectiveness of policies. There are also many practical questions in this area. For example: How do the International Pacific Halibut Commission and the regional fisheries councils differ in their effectiveness of regulating stock and why? Did the U.S. Forest Service meet the goals set out for it by Congress? Are different levels of regulation, such as endangered species designation with and without critical habitat designation, important? What are the roles of cheating and politics in making the Clean Air Act effective? Similar questions are also pertinent in developing countries.

To present a paper at this workshop, please submit a three-page abstract to Peter Berck, Workshop Chair, at the address below. **Abstracts are due December 15, 1999.** Expenses of paper presenters will be covered up to a maximum of \$1,000, including workshop registration, airfare, ground transportation, hotel, meals, and incidental workshop-related expenses. All paper presenters must be AERE members. Nonmembers may join at the time of registration. Authors will be notified of the status of their submissions by January 28, 2000. Accepted papers are due May 1, 2000, and must not be published before the time of the workshop.

Further information, including registration forms and travel and lodging information, will be mailed to AERE members in early 2000.

AERE gratefully acknowledges the funding provided by the National Oceanic and Atmospheric Administration, the U.S. Department of the Interior, Fish and Wildlife Service, and the U.S. Department of Agriculture, Economic Research Service, and the support provided by the Scripps Institute of Oceanography for the use of the Hubbs Conference Center.

**Send abstracts to Prof. Peter Berck.**

**By U.S. Mail or Overnight Service:**  
**Department of Agricultural and**  
**Resource Economics and Policy**  
**207 Giannini Hall**  
**University of California, Berkeley**  
**Berkeley, CA 94720-3310**

**By E-mail: [pberck@uclink4.berkeley.edu](mailto:pberck@uclink4.berkeley.edu).**  
**Use the words "AERE Abstract" as the e-mail**  
**subject.**

**No facsimiles, please.**

**Peter Berck**

**ALLIED SOCIAL SCIENCE  
ASSOCIATIONS (ASSA)**

The 2000 Winter meeting of the ASSA will be held in New Orleans, LA on January 5-7, 2001. AERE will sponsor six contributed papers sessions of three to four papers each. Those wishing to have a paper considered for AERE's sessions should send six copies of a 1-3 page abstract. Submissions must be postmarked or sent via facsimile **by May 19, 2000** to Prof. Anna Alberini who is currently at the University of Colorado, Boulder. Effective January 8, 2000, she will be at the University of Maryland, College Park. Both addresses are listed below.

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**After January 8, 2000:**

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Proposals for complete sessions are also invited. Organizers of proposed sessions should submit abstracts of papers following the above instructions. Papers may be accepted or rejected on an individual basis unless the organizer specifically requests the session be considered only in its entirety.

Due to limited resources, those wishing to have receipt of their submissions must also submit a self-addressed, stamped postcard.

**AMERICAN AGRICULTURAL ECONOMICS  
ASSOCIATION (AAEA)**

The 2000 Summer meeting of the AAEA will be held in Tampa, Florida on July 30 - August 2, 2000. AERE will sponsor three selected papers sessions. Those authors wishing to have a paper considered for AERE's sessions should send six copies of a 1-3 page abstract. Submissions must be postmarked or sent via facsimile **by January 14, 2000 to Prof. Anna Alberini** (see information about mailing addresses above).

Proposals for complete sessions are also invited. Organizers of proposed sessions should submit abstracts of papers following the above instructions. Papers may be accepted or rejected on an individual basis unless the organizer specifically requests the session be considered only in its entirety.

Due to limited resources, those wishing to have receipt of their submissions must also submit a self-addressed, stamped postcard.

**DELAWARE SEDIMENT & STORMWATER  
CONFERENCE 2000**

The Sediment and Stormwater Management Program of Delaware's Department of Natural Resources and Environmental Control (DNREC), Division of Soil and Water Conservation, announces a call for papers for the Conference 2000 slated for October 24-27, 2000 at the University of Delaware, Clayton Hall Conference Facility in Newark, Delaware. The Conference will focus on topics related to erosion, sediment and stormwater management as well as related resources issues.

Contributors must submit one copy of a typewritten, single-spaced abstract **by November 30, 1999**. The abstract should not exceed 250 words. An "Abstract Submittal Form" is required and may be obtained from Jeanne Feurer, Conference Coordinator, Telephone: 302-739-4411; E-mail at [jfeurer@dnrec.state.de.us](mailto:jfeurer@dnrec.state.de.us).

## Topics of Papers Requested for Submittal:

- Regulatory Programs—NPDES, TMDLS, Nonpoint Programs;
- Program Implementation—Innovative Strategies to Meet Regulatory Challenges;
- Best Management Practices—Design, Research, Monitoring, and Modeling;
- Resources Protection Efforts—Riparian and Wetland Protection and Enhancement;
- Watershed Programs—Management Issues, Funding Options, Tributary Strategies;
- Low Impact Development/Nonstructural Approaches for Stormwater Management;
- Specific Case Studies—Ideas from the private and nonprofit sectors;
- Specific Case Studies—Ideas from the local, state and federal agencies.

Abstracts will be reviewed for originality, technical merit, and benefit or significance to the conference. Acceptance notification will be made to the presenting author by January 15, 2000. Authors will be expected to submit complete papers (not to exceed eight single-spaced pages). Final papers must be received by April 1, 2000. All presenters of oral papers must register for the conference. A discount of registration fees will be available for accepted presenters. Presenters will be responsible for paying their own travel expenses.

## EAERE 2000 ANNUAL CONFERENCE

**Rethymnon, Crete, Greece  
June 30 - July 2, 2000**

### Program

The three-day program will consist of plenary sessions with keynote speakers and parallel sessions with contributed papers in areas of interest to the EAERE. The topics can be in all fields of environmental and resource economics. Both theoretically and empirically oriented papers are welcome. The conference program will also include social events in the evenings.

## Call for Papers

Those who wish to submit a paper to the conference should mail four copies of the paper, including a one-page abstract, to the Program Committee (see address below) **before January 15, 2000.**

## Venue

Crete stands at the crossroads of Europe, Asia and Africa. Evidence of its rich history, mythology and culture is reflected in its many well-preserved structures from earlier civilizations including Minoan, Byzantine and Venetian periods. Rethymnon is located on the northern coast of Crete, between Chania and Iraklion. It is a modern city, which has maintained its historical role as the Cretan city of arts, culture and education. The temperature in the summer months averages 79°F (26°C) making it ideal for swimming and other water sports at its many sandy beaches, as well as hiking and exploring of its varied terrain of mountains and gorges.

## Information

Further information on program, registration costs and hotels will be provided in an announcement and second call for papers. See web site at:

<http://www.soc.uoc.gr/calendar/2000EAERE/index.htm>

## Conference Executives:

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## Program Committee

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## MEETINGS AND WORKSHOPS

### ALLIED SOCIAL SCIENCE ASSOCIATIONS (ASSA)

January 7-9, 2000  
Boston, Massachusetts

#### AERE PAPERS SESSION

##### Valuation of Mortality Risk Reductions (J17, J28, Q26)

**Presiding:** James Hammitt  
Harvard School of Public Health  
**Date/Time:** Friday, January 7<sup>th</sup>, 8:00 a.m.  
**Place:** Sheraton, Beacon A

##### **Papers:**

1. Alan J. Krupnick (Resources for the Future [RFF]), Anna Alberini (University of Colorado), Maureen Cropper (University of Maryland [U of MD] and The World Bank), Ron Goree and Bernie O'Brien (McMaster University), Natalie Simon (EPA), and Martin Heintzelman (RFF), "What Are Older People Willing to Pay to Reduce Their Risk of Dying?"
2. James Hammitt (Harvard School of Public Health), "Evaluating the Effect of Visual Aids on Willingness to Pay for A Reduction in Mortality Risk"
3. Carol Robinson (Center for Disease Control) and Laura Taylor (Georgia State University), "Consistent Risk Measurement, The Sources of Risk, and Estimating the Value of a Statistical Life"

##### **Discussants:**

James Hammitt, Harvard University  
Richard Bishop, University of Wisconsin  
Maureen Cropper, The World Bank

##### Advances in Valuation Methods (Q26)

**Presiding:** Anna Alberini, University of Colorado  
**Date/Time:** Friday, January 7<sup>th</sup>, 10:15 a.m.  
**Place:** Sheraton, Beacon A

##### **Papers:**

1. Joseph Herriges (Iowa State University [ISU]), Catherine Kling (ISU) and Daniel Phaneuf (North Carolina State University), "What's the Use? Recovering Both Use and Non-use Values from Revealed Preferences in Kuhn-Tucker Models"
2. Kevin Boyle (University of Maine), Richard Bishop (University of Wisconsin), Daniel Hellerstein (U.S. Department of Agriculture [USDA]), Michael Welsh (Christensen Associates), Mary Ahearn (USDA), Andrew Laughland (Fish and Wildlife Service [FWS]), and John Charbonneau (FWS), "Tests of Scope in Contingent Valuation Studies: Are the Numbers for the Birds?"
3. Katherine Kiel (College of the Holy Cross) and Jennifer Weinberger (U.S. Environmental Protection Agency [EPA]), "Jointly Estimating the Prices of Environmental Goods"
4. Ted Gayer (Georgetown University) "Neighborhood Demographics and the Distribution of Hazardous Waste Risks: An Instrumental Variable Estimation"

##### **Discussants:**

Kenneth E. McConnell, University of Maryland,  
College Park  
Timothy Haab, East Carolina University  
Daniel Hellerstein, U.S. Department of Agriculture  
Diane Hite, Mississippi State University

##### Land Use Change and the Environment: Econometric Methods for Policy Analysis (Q24, R14)

**Presiding:** Andrew Plantinga, University of Maine  
**Date/Time:** January 7<sup>th</sup>, 2:30 p.m.  
**Place:** Sheraton, Beacon A

##### **Papers:**

1. Ian Coxhead (University of Wisconsin) and Agnes Rola (University of the Philippines, Los Baños), "If Land Use Influences Land Degradation, What Influences Land Use?"

2. Ian Hardie (U MD), Peter Parks (Rutgers University), Peter Gottlieb (U MD), and David Wear (U.S. Forest Service), "Integration of Urban and Rural Land Use Models: Necessary to Predict Land Allocation?"
3. Douglas J. Miller (Iowa State University) and Andrew Plantinga (University of Maine), "A Non-stationary Markov Model of Dynamic Land Use and Applications to Controlling Non-point Source Pollution"
4. Colin Vance and Jacqueline Geoghegan (Clark University), "Spatially Explicit Models of Land-Use Change: An Application to a Semi-Subsistence Agriculture in Southern Mexico"

**Discussants:**

Peter Parks, Rutgers University  
 Mary Ahearn, U.S. Department of Agriculture  
 James Shortle, Pennsylvania State University  
 Kathleen Bell, University of Washington

**Analyzing the Costs of Environmental Protection (D61)**

**Presiding:** Robert N. Stavins  
 John F. Kennedy School of  
 Government, Harvard University  
**Date/Time:** January 8<sup>th</sup>, 10:15 a.m.  
**Place:** Sheraton, Beacon A

**Papers:**

1. Winston Harrington (RFF), Richard Morgenstern (EPA), and Peter Nelson (RFF), "On the Accuracy of Regulatory Cost Estimates"
2. Sarah West (University of Texas, Austin), "Estimation of the Joint Demand for Vehicles and Miles: Analyzing the Distributional Impacts of Alternative Car Pollution Control Policies"
3. Terry Dinan (Congressional Budget Office) and Diane Lim Rogers (The Urban Institute), "The Distributional Effects of a Carbon Allowance Trading Policy"
4. Carl Pasurka (EPA), "Sources of Change in Measurable Pollution Abatement Costs: A Joint Production Perspective"

**Discussants:**

Robert N. Stavins, Harvard University  
 Larry Goulder, Stanford University  
 Ian Parry, Resources for the Future  
 Charlie Kolstad, University of California, Santa Barbara

**Measuring the Effects, Benefits and Costs of Environmental Regulation (D61)**

**Presiding:** Wayne Gray, Clark University  
**Date/Time:** January 9<sup>th</sup>, 8:00 a.m.  
**Place:** Sheraton, Beacon A

**Papers:**

1. Randy Becker (U.S. Bureau of the Census) and Vernon Henderson (Brown University), "Costs of Air Quality Regulation"
2. David Popp (University of Kansas), "Induced Innovation and Energy Prices"
3. Wayne Gray (Clark University), "The Environmental Compliance of Paper Mills: The Impact of Regulatory Enforcement and Corporate Restructuring"
4. Dietrich Earnhart, (University of Kansas), "Environmental Compliance and Enforcement"

**Discussants:**

Virginia McConnell, University of Maryland,  
 Baltimore  
 Adam Jaffe, Brandeis University  
 Eric Helland, Ball State University  
 David Austin, Resources for the Future

**Natural Resource Modeling and Policy (Q24, Q30, Q38)**

**Presiding:** Heidi J. Albers  
 Resources for the Future  
**Date/Time:** January 9<sup>th</sup>, 1:00 p.m.  
**Place:** Sheraton, Beacon A

**Papers:**

1. Janie Chermak (University of New Mexico) and Robert Patrick (Rutgers University), "Reconciling Empirical Tests of the Theory of Exhaustible Resources"
2. Y. H. Farzin (University of California, Davis), "The Impact of Oil Price on Additions to Proven U.S. Reserves"
3. Maureen Cropper (U of MD and The World Bank), Jyotsna Puri and Charles Griffiths (EPA), "Predicting Spatial Patterns of Deforestation: The Role of Roads and Protected Areas in North Thailand"
4. Carol Mansfield (Duke University), Subhrendu Patanayak (Research Triangle Institute), and Will McDow (Duke), "The Role of Ecological Factors and Economic Factors in the Preservation of Significant Natural Heritage Areas in North Carolina"

**Discussants:**

Robert Deacon, University of California, Santa Barbara  
 Carolyn Fischer, Resources for the Future  
 Robert Mendelsohn, Yale University  
 Amy Ando, University of Illinois

- Richard Morgenstern, EPA, "Do Policy Reform Objectives Change with Benefit Cost Evaluations? Lessons from EPA's Section 812 Activities"
- Robert Stavins, Harvard University, "Will EPA's Prospective Evaluation Pass the Laugh Test?"

**AERE INVITED SESSION****Market-based Instruments**

**Presiding:** Nancy Bockstael, University of Maryland, College Park  
**Date/Time:** January 8<sup>th</sup>, 2:30 p.m.  
**Place:** Sheraton, Beacon A

**Papers:**

- Richard Newell (RFF) and Robert N. Stavins (Harvard University), "Heterogeneity of Abatement Costs and the Potential Gains from Market-based Environmental Policies"
- Carolyn Fischer, Ian Parry and William Pizer (RFF), "How Important is Technology Policy in Protecting the Environment?"
- Quinn Weninger (Utah State University) and Richard Just (U of MD), "Firm Dynamics with Tradeable Environmental Permits"
- Paul Leiby (Oak Ridge National Laboratory) and Jonathan Rubin (University of Maine), "Flexible Greenhouse Gas Emissions Banking Systems"

**Discussants:**

Catherine Kling, Iowa State University  
 Karen Fisher-Vanden, Dartmouth College

**JOINT SESSION WITH THE AMERICAN ECONOMIC ASSOCIATION****Does Retrospective and Prospective Benefit Cost Analyses Improve Environmental Policy?**

**Presiding:** V. Kerry Smith  
 North Carolina State University  
**Date/Time:** January 8<sup>th</sup>, 8:00 a.m.  
**Place:** Sheraton, Beacon A

**Papers:**

- Randall Lutter (American Enterprise Institute), "Lessons from the Design of the Retrospective Analysis of the Clean Air Act for the Prospective Evaluation"
- Paul R. Portney, RFF, "If We Know Net Benefits Are Positive, Why Do Evaluation?"

**RANDOM UTILITY 2000****Conference and Workshop on "Random Utility Theory and Probabilistic Measurement Theory"**

**Fuqua School of Business  
 Duke University  
 August 3-8, 2000**

**The events and the leaders:**

*Four half-day tutorials:* "Axiomatic Measurement Theory and Its Probabilistic Extensions," (R.D. Luce and P. Suppes); "Choice Paradigms," (A.A.J. Marley); "The Mathematical Structure of Random Utility Characterization Problems," (P. Fishburn, F. Roberts); "Probabilistic Measurement Theory," (G. Iverson).

*Eight half-day themes:* "Mathematics of Nonparametric RU Models," (J.-P. Doignon, M. Koppen); "Stochastic Models of Preference Evolution," (J.-C. Falmagne, S. Ovchinnikov); "Parametric RU Models," (H. Joe, R. Suck); "Applications to Economics and Management," (M. Ben-Akiva and D. McFadden); "Applications to Psychology and Marketing," (U. Bockenholt and J. Huber); "Applications to Economics, Social Choice and Political Science," (M. Alvarez, J. Brehm, and P. Pattanaik); "Probabilistic Measurement Theory," (H. Colonius, D. Heyer, and R. Niederee); Wrap-up discussion (A.A.J. Marley).

**Registration/Application/Funding:**

Space will be limited to approximately 40 participants (in addition to the approximately 20 session leaders). Junior scholars (advanced graduate students or persons who received Ph.D. degree no earlier than August 1, 1994) are strongly encouraged to apply. Accepted junior scholars will be exempt from the conference registration fee and provided free lodging (university housing) and meals during the meeting. Limited funds for travel support are also available. **Application deadline: December 1, 1999.** Application details: [www.fuqua.duke.edu/ru2000](http://www.fuqua.duke.edu/ru2000).

## ESSAYS

### Environmental Tax Reform: Prospects and Progress in the States

by M. Jeff Hamond and Brian Dunkiel\*

Members of AERE are undoubtedly aware of the idea for environmental tax reform (ETR), an issue that was discussed at July's AERE Workshop at Harvard University. To refresh, the concept of an ETR involves a shift from taxes on "good" things, such as work, investment, and profits to taxes on "bad" things such as pollution, waste, and resource inefficiency. Usually, such a shift is proposed to be revenue-neutral, although some advocates believe that a portion of the revenues would be well-spent on new investments in environmental technologies or human capital. (For a general summary of the issue, please see either of these Web sites:

[http://www.rprogress.org/pubs/twnw/twnw\\_execsum.html](http://www.rprogress.org/pubs/twnw/twnw_execsum.html)  
or  
<http://www.foe.org/envirotax/taxbooklet/index.html>.)

Until recently, the literature on the topic had focused almost exclusively on the complex question of the "double dividend"; that is, could a tax shift lead to economic and environmental gain at the same time, by reducing the total deadweight loss of the tax system and improving economic efficiency? While this debate goes on, several groups—such as Redefining Progress—have been working to broaden the ETR research base by sponsoring working papers on new research topics. For example, Gib Metcalf of Tufts University allayed some concerns about regressivity by showing that a federal-level ETR could be distributionally neutral, or even increase progressivity. A paper by Andrew Hoerner of the Center for a Sustainable Economy shows that more than 80 percent of American workers are in industries that would be net winners under an ETR. And Matthew Kahn of Columbia University is writing a paper

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\*M. Jeff Hamond is the former Deputy Director of the Incentives Program at Redefining Progress and now works on Capitol Hill. Brian Dunkiel is the Director of Tax Policy and Staff Attorney for Friends of the Earth, and can be reached at [bdunkiel@foe.org](mailto:bdunkiel@foe.org). Portions of this article previously appeared in the March/April 1999 issue of *E: The Environmental Magazine*. For the full text of the article—a cover story on environmental tax reform—please see [http://www.emagazine.com/march-april\\_1999/0399feat1.html](http://www.emagazine.com/march-april_1999/0399feat1.html).

demonstrating how an ETR at the state level could help create new opportunities in urban areas. (Please see <http://www.rprogress.org/pubs/publist.html> for more information on these papers.)

[On the question of the double dividend, it is worth noting for the AERE readership that a few former skeptics are beginning to believe that dual dividends may indeed be possible. For example, Ian Parry of Resources for the Future, who had formerly expressed doubt about the double dividend, recently released a working paper with Antonio Bento of the World Bank in which they found that with an ETR (or alternatively, using the revenues from auctioned permits to reduce existing taxes), the economic costs of modest emissions reductions may be negative. The paper is available at <http://www.worldbank.org/html/dec/Publications/Workpapers/wps2000series/wps2119/wps2119.pdf>.]

Although green tax reform is not exactly becoming the law of the land, it is beginning to make inroads on the state level, where a blizzard of bills have been introduced and a healthy dialogue is building. Here's a state-by-state look at some recent developments.

#### Maine

Progressive financial ideas are alive and well in Maine, which has enacted some of the nation's strictest campaign finance reform laws. One of the most stalwart reformers is State Senator Peter Mills, the ranking Republican member of the Taxation and Labor Committee, who recently proposed that the State Planning Office study tax shifts to promote environmental objectives, including taxes on carbon emissions and other pollutants. The proposal was turned back on a technicality, but Mills wants to reintroduce it, and is seeking bipartisan co-sponsorship.

The Maine Center for Economic Policy and the Mainewatch Institute are developing an advisory committee to develop and test tax-shifting proposals. The committee will have input from four panels, representing industry, stakeholders (from oil dealers to environmentalists), tax experts and economists, and regular citizens.

From this process, a consensus bill that can survive in the state legislature is expected to emerge.

Though per capita energy use is high in Maine, the idea of shifting taxes from income and onto polluters has considerable appeal in a state with famously independent voters.

## **Michigan**

Through the work of former Democratic State Representative Kirk Profit, the Michigan legislature has its own Subcommittee to Explore the Environmental Sensitivity of the Michigan Tax Code. Hearings began in 1997, and the committee soon evolved eight bills that offered tax incentives for a variety of positive activities. Through the legislation, manufacturers could earn tax credits for energy conservation, and for operating fleets of alternative fuel cars. Four bills out of the eight introduced were enacted in 1998, including provisions to offer tax credits for the purchase and installation of recycling equipment; to partially exempt green car buyers from sales tax; and to completely exempt them from the state use tax.

## **Minnesota**

Green tax reform has an interesting history in Minnesota. It first appeared, in the form of a modest proposal for a \$6 per ton carbon tax to fund wind power incentives, in 1992. The group that issued that proposal, Minnesotans for an Energy-Efficient Economy, has since become very active in working for a tax shift, often in coalition with other state groups.

In 1996, a far-reaching Economic Efficiency and Pollution Reduction Act was proposed by State Senator Steve Morse and State Representative Ann Rest. The bill would have cut payroll and property taxes by \$1.5 billion a year, with the revenue replaced by pollution taxes. It was defeated in a tie committee vote, and then reintroduced in revised form the following year. In its second incarnation, it completely eliminated property taxes, and used carbon tax revenue to pay for education. This version was withdrawn before a vote could be held.

Public opinion polls show that a majority support environmental tax shifting, particularly if it lowers property tax bills. Despite studies showing that industry costs could decrease if tax reform were implemented, opposition to ETR in Minnesota has been vocal. The loudest voices against it are extractive industries, the Teamsters Union and airlines.

## **Oregon**

Oregon Governor John Kitzhaber is intrigued by the ETR idea, and convened an Environmental Taxation Subcommittee that was to present recommendations by the end of 1998. Northwest Environment Watch estimates that a tax transfer in Oregon could reduce business and income taxes from 46 percent of state revenues to 14 percent, and eliminate all property taxes. Taxes on pollution, carbon and traffic would be added to the 12 percent of state revenues that are already raised by environmentally-conscious levies.

A plethora of proposals are pending in Oregon's legislature in 1999, including a tax on pesticides, an environmentally redirected water permit pollution fee that penalizes polluters, and legislative funding for a large-scale tax-shift study. Some Oregon activists are even lobbying for a plan to return pollution tax revenue directly to taxpayers in lump-sum payments. "I think there's definitely a chance to air these issues at a higher level than was there before," says Jeff Allen, executive director of the Oregon Environmental Council.

## **Vermont**

Vermont's Department of Public Service issued a report last summer entitled *Fueling Vermont's Future: Comprehensive Energy Plan and Greenhouse Gas Action Plan*. It is a strikingly progressive document that emphasizes pressuring the marketplace to produce more environmental results by including social costs as part of market prices.

In the report, the state agency examines what would happen if a carbon tax were imposed, with revenues returned to taxpayers via other tax cuts; and if motor vehicle registration and licensing fees were reduced in favor of fuel taxes. The report estimates that the two tax shifts together would cut fossil fuel use in the state by 16.2 percent as soon as 2000, while also stimulating a 38.7 percent increase in the use of renewable energy. Energy use for transportation would decline 30 percent, and emissions that cause acid rain and smog would fall 20 percent. In the long run, the report concludes, such tax shifts would increase employment and make energy more affordable.

In 1996, Vermont passed Act 60, a radical refinancing of public school education that includes among its provisions a four-cent-a-gallon increase in the state's gasoline tax. Earlier provisions that included a more far-reaching pollution and energy tax were killed in committee. A bill based on the state report, which would

implement most of its proposals, including a \$100 per ton carbon tax, is pending in the state legislature.

Friends of the Earth works with a growing coalition of Vermont business, consumer, low-income and environmental organizations set on promoting ETR. The coalition recently released a report called *Tax Reform that Agrees with Vermont*, which reviews a menu of ETR options for the state. The report can be found on the Internet at [www.foe.org/envirotax/](http://www.foe.org/envirotax/).

## California

Finally, in California, where Proposition 13 and unprecedented growth have placed huge fiscal pressures on local government, a new coalition has formed to push for environmentally responsible changes in the state's budget and tax policies. The new group, the California Tax Reform Coalition, is a collaboration between the

California League of Conservation Voters Education Fund, the California Tax Reform Association, the Next Generation, and Redefining Progress. The Coalition jointly released a report called *Greening the Golden State: A Tax Reform for the New California* in July 1999, which outlined how and why an ETR could work in California. The report offered a number of possible tax reductions and increases, and suggested three different ETR scenarios—one focused on transportation and energy, one on resources and pollution, and one on property and land use.

The Coalition has just begun to work with legislators and the press to promote the idea of an ETR in the nation's most populous state, so there's a long road ahead, but the group hopes to make progress with incremental changes while it builds support for the larger ETR idea.



## Controlling Inputs to Control Pollution: When Will It Work?<sup>1</sup>

by Gloria E. Helfand<sup>2</sup>

Occasionally in environmental regulation it is proposed that regulatory instruments be applied to inputs to production, rather than to pollution itself. This situation arises with, for example, nonpoint source water pollution, where the effluent itself cannot be observed easily (e.g., Griffin and Bromley); and pollution prevention, where it is argued that reduction in the use of toxic inputs avoids multimedia disposal problems (U.S. Environmental Protection Agency). To replicate the efficiency of a pollution tax, in general, each input that contributes to pollution must be taxed (Holtermann). Additionally, if pollution functions differ among the sources of pollution, the input taxes must be differentiated by source (Griffin and Bromley).

In issues ranging from controlling toxic substances (Macauley, Bowes, and Palmer) to garbage disposal (Lifset), questions arise about how to regulate damaging substances that are inputs to production or consumption processes, and whose damages depend on their use or disposal. This paper discusses the implications and complications associated with controlling inputs to production processes rather than controlling pollution or damages.

This paper addresses two major issues: first, whether various pollution control instruments, when applied to inputs, can achieve a social optimum; second, under what conditions pollution control instruments applied to inputs might not reduce pollution. As will be discussed,

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<sup>1</sup> This analysis is based on a working paper available from the author. That paper contains more detailed derivations and discussions of the results.

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achieving the social optimum might not be feasible, due to high transactions costs. Since suboptimal instruments then become the primary means to regulate input use, it is important to examine possible unintended side effects of those instruments.

### **Taxes, Permits, and Standards for Input Markets**

The theory of pollution taxes and permits has been developed primarily in the final market—that is, either the market for damages or for emissions. In pollution markets where emissions from one source are a direct substitute for emissions from another source, taxes and permits geared to the same level of pollution will both provide a least-cost solution and are often considered equivalent from an efficiency perspective. While it is tempting to assume that this result holds as well if taxes or permits are used in input markets, in fact the efficiency characteristics are not the same.

Social optimality for input use requires that the value marginal product of an input being used in positive amounts at the optimum should equal the social cost of that input, where the social cost equals its cash cost per unit plus the damage caused by the marginal unit of that input. If marginal damages are constant across firms, and if effluent taxes reflect the marginal damages from each firm's pollution, the usual optimality for a pollution tax can be demonstrated.

**Input Taxes.** As long as either the effects on cumulative damage of pollution from each source, or the contribution of input  $m$  to pollution from each source, differs among some firms, then separate input taxes need to be developed for all inputs that influence pollution and for each source of pollution. Even if total damage is the sum of pollution from each source, the input taxes must vary to account for the fact that sources do not have identical pollution functions.

If an optimal set of input taxes can be developed, it should have the same long-run optimality conditions, in terms of getting the right number of firms in an industry, as Spulber has identified for an optimal effluent tax. Spulber's analysis showed that, if firms are small enough that the effects of entry on marginal social damages are negligible, then an effluent tax set at marginal social damages achieves a long-run efficient market equilibrium. The conditions identified by Spulber are replicated for inputs with the right tax level.

Thus, social optimality can be attained by a well designed set of input taxes. What is less clear is whether input taxes are likely to have the characteristics required

for social optimality—in particular, that each firm will have individual taxes (or subsidies for abating inputs) for each input. In many cases, having separate input taxes might not be enforceable. For goods sold in retail or wholesale markets, it would be almost impossible for a vendor to charge different prices to each purchaser. Additionally, if the good can be resold easily, then a black market in the input could develop, with low-tax input purchasers reselling the input to high-tax purchasers or themselves using the input for a high-tax purpose (see, e.g., Macauley, Bowes, and Palmer). Finally, equity considerations arise as individuals or businesses are charged different amounts for the same good.

In some situations, though, individual input prices may be more easily enforced. The necessary ingredient is the ability to discriminate among users by price. For instance, many utilities for supply of energy or water are local monopolies and can be expected to have (or currently do have) the ability to price-discriminate. Additionally, these utilities are frequently regulated, which suggests the possibility that pollution taxes could be incorporated into their rate structures.

In general, generation of pollution is likely to involve combinations of openly marketed goods and those produced by utilities. Since individual input taxes could only be achieved on some of the inputs, it is unlikely that the social optimum can be attained. Combinations of individual and uniform (or absent) input taxes cannot be ranked *a priori*: as suboptimal instruments, these approaches can only be compared in empirical studies.

**Marketable Input Permits.** A system of marketable permits for inputs would restrict the total availability of each input and allow markets to determine the value of the input. Social optimality conditions can only be met if each pollution source's use of each input has the same effect on aggregate damage. If sources differ in their effects—either because pollution from one source does not have the same effect on total damage as pollution from another source, or because use of an input by one firm has a different effect on its pollution than does use by another firm—then a system of marketable input permits will not achieve the social optimum.

Marketable input permits, almost by definition, lead to equalization of marginal costs of the inputs across firms, while social optimality requires distinguishing the social costs caused by each firm. This result is analogous to the problem with marketable emissions or effluent permits when the pollution from one source is not equivalent to the pollution from another; the levels of permits then need to be adjusted by a mechanism such as transfer coefficients

(see, e.g., Baumol and Oates). Here, the problem is compounded because of differential effects of the input on pollution from each source.

It could be difficult even to determine the levels of aggregate input use necessary to achieve a specified level of total damage. There is generally not a unique vector of the total level of each input  $\mathbf{X} = \{X_m, m = 1, \dots, M\}$  to achieve a specified level of aggregate pollution  $Z = Z[z^1(x_1^1, \dots, x_M^1), \dots, z^N]$ , where  $z^n$  is the pollution from firm  $n$  resulting from its use of inputs  $x_m^n$ . Even with a specified  $\mathbf{X}$ , different allocations of inputs among the  $N$  firms can lead to different levels of pollution. Developing a system of marketable permits in input markets, then, will not clearly achieve a specified pollution level without a great deal of information on the part of the regulator.

**Input Standards.** Under certainty, a system of firm-specific input restrictions (quantity controls) is the dual to a set of firm-specific input taxes. Here, the requirement to achieve the social optimum (Griffin and Bromley) would be to designate separate input requirements for every input used by each producer. The number of instruments would be as large as for a system of taxes. In this case, assuming perfect enforcement, the problem of resale markets would be avoided: producers would pay the same prices for inputs but would be restricted in how much they could use. Industry-specific regulations exist for emissions under the New Source Performance Standards of the Clean Air Act (Office of the Federal Register 1987); it is possible that industry-specific regulations could be developed on input use (though such regulations would still not be plant-specific). Still, enforcing a system of this nature would not be easy, since it would require monitoring use of every input by every source. Additionally, based on Spulber's analysis, it is likely that a set of input standards could lead to excessive entry into the industry relative to the social optimum.

In sum, it is theoretically possible, using either a system of firm-specific input taxes or standards, to achieve the same least-cost pollution reduction as a system of damage-based taxes. In practice, though, it appears very difficult, if not impossible, to achieve this optimum. A system of permits, unless differentiated in some way by sources, will not achieve the optimum.

### Suboptimal, Uniform Input Instruments

Given the difficulty of achieving the socially optimal set of input control instruments, it is worthwhile to consider the effects of input instruments that are simpler to implement even if they are unlikely to achieve a least-cost solution. Possibilities include a set of uniformly applied

input taxes, permits, or standards, applied either to some or all of the inputs to pollution. Note that a set of uniform input taxes has the same marginal effects as a corresponding set of marketable permits for those inputs, as both lead to equalization of the input cost across all producers. As these are all suboptimal instruments (excluding consideration of transactions costs), their relative efficiency cannot be determined *a priori*, but only in the context of an empirical analysis.

Perhaps the most important general consideration for these instruments is whether they will in fact reduce pollution. This situation can arise theoretically in at least four circumstances.

First, if only a subset of inputs is subject to a regulatory instrument, then it is possible that restricting or taxing some inputs might lead to increased use of other inputs that increase pollution; if that substitution is substantial, then pollution might increase. For instance, if all inputs contribute to pollution, but only one input is taxed, another, possibly more damaging input might be used more heavily, and damages might increase.

Secondly, in some cases an input can either abate or contribute to pollution, depending on its use. For instance, water can be used to dilute effluent into a receiving water body, thus reducing the impact of the effluent; it can also contribute to pollutants entering water bodies, as when irrigation water leaches salts, fertilizers, or pesticides out of soil and transports it into a water body. Thus, in some cases water reduces damages and in other cases it increases it. Instruments that cannot differentiate among sources will lead either to higher use where it contributes to damages or lower use where it abates pollution; either condition will lead to an ambiguous effect on pollution levels.

Third, pollution could increase if polluting inputs are complements in the production process to some abating inputs. If an instrument is intended to reduce use of polluting inputs, then the abating inputs will be reduced as well; if rules are put in place mandating minimum use of abating inputs, the polluting inputs might increase. Overall effects in either case on pollutant levels are ambiguous. A fourth case may occur when specific technologies, which can sometimes be interpreted as input requirements, are required for pollution reduction. Changes in variable inputs due to a new technology can lead to perverse effects. For instance, Caswell and Zilberman note that improved irrigation technology can increase water demand, as the value marginal product of water increases. Installing scrubbers on industrial smokestacks reduces the incentive for purchase of low-sulfur coal. Further,

installation of capital equipment does not always mean that the capital will be well maintained, as breakdowns in sewage treatment plants often demonstrate. If technological fixes are to be required, their use in practice must be analyzed carefully.

The question naturally arises as to when a uniform set of input instruments is likely at least to reduce pollution, even if not at least social cost. Two factors need to be considered: the relationships in the production function among the inputs (that is, whether they are substitutes or complements), and the effects of the inputs on pollution. If inputs tend to be complements in production, and if all inputs tend to contribute (or at least not abate) pollution, then restricting one or a subset of inputs will reduce pollution.

At the extreme, when only one input contributes to pollution, restricting the input will, by definition, reduce pollution. Or, if "clean" substitutes exist for a polluting input, then reductions in pollution will occur. These cases are the models on which the principle of pollution prevention is based: less use of dangerous inputs will reduce pollution more directly than requiring a pollution reduction. In some cases, such as the use of lead in gasoline or chlorofluorocarbons (CFCs) for refrigeration, the direct relationship between the input and damage is likely (though, with CFCs, much attention is deservedly being directed to the environmental effects of possible substitutes). In other industrial contexts, the more complicated scenarios discussed above are likely to hold.

How likely is it that regulating some inputs might lead to increased pollution? In the case of agricultural production and the resulting runoff, problems may not be highly likely. Because it is often argued that agricultural production functions exhibit complementarities (Grimm, Paris, and Williams), and because several of the inputs can contribute to pollution (Larson, Helfand, and House), inducing a reduction in use for some inputs is highly likely to lead to a reduction in pollution. Manufacturing situations are likely to be more variable and dependent on the specific industry. In the pollution prevention context, examples are cited of companies that reduced use of toxic substances, sometimes with increased profits due to improved production techniques (U.S. Environmental Protection Agency 1991, Chapter 3), implying strong substitution possibilities toward cleaner technologies.

### **Intermediate Goods**

Often, firms produce goods that become inputs to another firm's production function. How this intermediate good is designed can affect the level of externality

produced from the final good. Holtermann cites as examples addition of lead to gasoline, which is then sold at the retail level; noise from airplanes that are produced by one company but flown by others; consumer goods that are sold in nonrecyclable packaging. In these cases, Holtermann argues that efficient regulations require taxation both at the intermediate good stage and at the final good stage (though the tax could in theory be collected at either level): the intermediate producer needs an incentive to reformulate its product to reduce damages, while the final producer (or consumer) needs an incentive to consume the "right" amount of the good, as well as to take appropriate abatement action itself.

### **Conclusions**

The environmental economics literature on input control has focused on achieving optimality—a natural focus, since suboptimal situations are inherently uncertain in their impacts. However, the optimal instruments—separate taxes or quantity controls for every input that affects pollution for every source—are very information-intensive and likely to suffer from monitoring and enforcement problems. For these reasons, suboptimal input instruments, especially instruments that are uniform across pollution sources, are more likely to be implemented.

If these suboptimal instruments are implemented, it is known that their social costs will be higher than an optimal set of instruments (though the magnitude of that loss is, of course, purely empirical); what is less certain is their effectiveness in reducing pollution. In many cases, the theoretical effect of these suboptimal instruments on pollution is ambiguous. A "dirty" input may be substituted for the targeted input; or, an input that increases pollution in some contexts may reduce pollution in others, and the total impact depends on the relative effects on pollution in each case. The problems in distinguishing instruments among sources, combined with lack of information about firms' production functions (and thus how firms will respond to input instruments), make it difficult to calculate the level of pollution reduction, if any, which can be achieved from applying suboptimal input instruments.

In at least one case, though, input reduction instruments will always work to reduce pollution: if one or a subset of inputs always contribute to pollution, without complementary abating inputs, and if all those inputs can be regulated. This case assumes away adverse substitution possibilities and thus ensures reductions in pollution. There could still be unintended substitution possibilities: reduced burning of carbon-based fuels (which always produce carbon dioxide) could lead to use of alternative

fuels, such as nuclear energy, whose environmental impacts are not always benign; and a reduction in all pesticide use, with reduction in their adverse impacts, could adversely affect farmworker health and safety through more labor-intensive cropping methods. Targeting inputs that are directly linked to pollution may not be as cost-effective as targeting the pollution itself, but it will at least achieve the goal of reducing damages. At the same time, it could lead to new, different damages from alternative technologies. Input instruments should not be ruled out of the environmental regulator's toolbox; in some cases, they may be the only feasible choice. Their use though, must be viewed with awareness of possible unintended consequences.

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## Economics and Environmental Policy: The View From the Council of Economic Advisers

by Stephen Polasky\*

Like many of my colleagues, I was drawn to economics through an interest in public policy. I briefly considered going to a public policy graduate program but chose economics instead. The invitation to join the Council of Economic Advisers (CEA) as a senior staff economist promised me not only a ringside seat to watch policy formation at the federal level but a chance to participate in the formation of policies. I found that being in the ring itself was an exciting, rewarding and frustrating experience. I came away from my year in Washington with an enriched understanding of the policy process and the role that economic analysis can, but sometimes does not play in the process.

The CEA consists of the chair and two other members, supported by ten to twelve senior staff economists and about half again as many staff economists. The senior staff economists typically come for one year either from academia or a different government agency. Staff economists typically are Ph.D. students who spend a year at the Council. The large turnover of staff each year is both a blessing and a curse. CEA's effectiveness in policy battles with other agencies is sometimes limited because CEA staff may not have the necessary background on the institutions, history or major players. On the other hand, CEA staff come to the table with good credentials, fresh ideas, and a certain independence that comes from being relative outsiders.

Though the CEA is small and populated by relative outsiders, it does have some clout. The Chair is a cabinet level official with direct access to the President. The members have the equivalent rank to Assistant Secretaries. The CEA is part of the Executive Office of the President and is housed in the Old Executive Office Building next door to the White House. In many ways, the CEA functions like an academic thinktank within the government. Not only does the staff largely come from academia, but the only statutory responsibility of the CEA is to produce a book each year—*The Economic Report of the President*. The CEA views its role as the guardian of efficiency in the policy process. In this task, the CEA has several allies, notably economists at the

Treasury Department and the Office of Management and Budget (OMB). There are also many antagonists including at times parts of main line agencies such as the Department of Agriculture or the U.S. Environmental Protection Agency (EPA). The CEA staff spend much of their time analyzing how well given proposals or policies rate on efficiency grounds and then arguing against inefficient or ill-conceived proposals. As one of my predecessors in the job, Jay Shogren, said “the CEA is a speedbump on the road to bad ideas.”

During my time at the CEA, July 1998 through June 1999, three issues dominated the environmental agenda. First, the CEA found itself at the center of debates about the cost of implementing the Kyoto Protocol on global climate change. Second, EPA issued a number of new rules or proposed new rules to implement the 1990 Clean Air Act, which were intensively reviewed by the CEA and other agencies. Third, the Administration released a proposal for electricity restructuring, of which many of the contentious issues were environmental ones. For each of these issues, economic analysis played a role in the policy debate, though often not a dominant one.

### Climate Policy

No single issue, environmental or otherwise, took more CEA time and resources over the past few years than has climate change. Of the 14 times that former CEA Chair Janet Yellen testified before Congress, 11 of those testimonies regarded climate change. In November 1997, U.S. negotiators, led by Vice President Al Gore, agreed to the Kyoto Protocol, requiring the U.S. to cut emissions of greenhouse gases by 7% from 1990 levels by 2010. The Kyoto Protocol immediately became the center of a fierce debate between Congress and the Administration. Upon arriving at CEA I was warned to be very careful what I wrote down on paper, or wrote in an email, because it was likely to end up in public the next time that Congress placed all CEA climate change related documents under a subpoena. Congressional critics claimed that meeting the cuts required by Kyoto

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\* I would like to thank John Loomis, Randy Lutter and Jay Shogren for helpful comments.

would impose large costs on the American economy. In addition, these critics feared that it would place the U.S. at a competitive disadvantage relative to the developing world, which was not given binding emissions reduction targets in the Protocol. The Administration claimed that the costs of abiding by the Kyoto Protocol would be modest and that it would not send the Protocol to the Senate for ratification unless it had meaningful participation by key developing countries.

The CEA was called upon to provide evidence backing the Administration's claim that the costs of achieving the required emissions reductions would be modest. The CEA undertook an analysis of the likely costs of achieving various levels of emissions reduction, which was then published as the Administration's Economic Analysis in July 1998. The bottom line of the analysis was that assuming there were an effective international emissions permit market, the cost per ton of carbon reduction would be \$14 to \$23 per ton, or about \$100 per household per year. Establishing an effective international emissions permit trading regime, of course, is a tall order, and there remain many unanswered questions about monitoring and policing such a regime. Analyses done at the CEA also showed that developing countries, the environment and developed countries could all be better off if developing countries took on binding targets and were allowed to trade since emission reductions would likely be cheaper there than elsewhere. The analysis of the Kyoto Protocol by CEA and others showed that if the U.S. had to reduce all of its emissions at home rather than purchase emissions from abroad, the costs would be far higher, perhaps 10 times as high, than with international trading. Critics of the Administration quoted the higher cost estimates from a domestic only emissions reduction program while the Administration quoted the lower cost estimates with international emissions trading.

The debate over climate change was not always very enlightening or rational. After several years of intense debate, neither side of the debate has budged. We are no closer to ratifying the treaty or suggesting alternative policy. Despite this, economic analysis has played a useful, in fact, essential role. Economic analysis provided much of the basic important information to policy makers. Just what would emissions reduction likely cost? How much would costs fall by instituting international permit trading? What cost advantages are there by providing greater flexibility in timing? Economic analysis shed light on each of these issues. While there remains wide disagreement over the best policy, at least among the politicians, there is far less disagreement among the economists working on this issue about the likely costs of the policy. IF there were effective

international permit trading involving key developing countries as well as developed countries, a very big if, then costs would be modest. Absent this occurring, the costs of meeting Kyoto imposed emission reductions would be substantially higher.

## **Air Pollution Policy**

A second area taking up a large share of the environmental portfolio at CEA in recent years is the review of new rules issued by EPA to implement the Clean Air Act. The new rules followed close on the heels of EPA issuing new National Ambient Air Quality Standards (NAAQS) in 1997. Establishing the new standards came only after a bitter fight within the Administration that pitted the "economic agencies" (CEA, OMB, Treasury) against the "environmental agencies" (EPA, Council on Environmental Quality, and others). EPA argued that new standards were needed to safeguard public health. The economic agencies argued that the costs of tightening the standards to the levels proposed by EPA would far exceed the benefits. EPA prevailed over the economic agencies in setting the NAAQS.

Some areas, particularly in the East, failed to meet the old NAAQS and many more areas would likely fail to meet the new NAAQS unless emissions standards were tightened. In the fall of 1998, EPA issued new standards for nitrogen oxides (NO<sub>x</sub>) emissions from large stationary sources in a 22-state region in the eastern U.S. Early in 1999, EPA issued preliminary rules tightening emissions from light duty vehicles (cars and light duty trucks) starting in 2004. By the end of 1999, EPA is supposed to release the final rule for light duty vehicle emissions. Both of these rules attracted a large amount of attention from both industry and environmental groups.

Both of these rules underwent an interagency review run by OMB. Under Executive Order 12866 issued by President Clinton, a regulatory impact analysis (RIA) must be undertaken for all new major regulatory rules; rules that will likely cost in excess of \$100 million per year. As part of the RIA, the likely costs and benefits of the rule must be estimated. Both the NO<sub>x</sub> standards for stationary sources and the light-duty vehicle emissions standards met this threshold.

The regulatory review process works on two very distinct levels. At the staff level, a number of substantive nuts-and-bolts cost-benefit issues are discussed. In fact, much of the analysis in a typical RIA would look quite familiar to an environmental economist. While at CEA, issues such as the appropriate discount rate, whether results from particular contingent valuation

studies were reliable, whether benefits estimates generated for one purpose could be transferred to other cases, and what was the appropriate value to use for saving a statistical life were discussed. Journal articles from the environmental economics literature were referenced and used as sources for estimates of various benefits and as authoritative sources on methodology. Staff discussions on cost-benefit issues in the RIA were professional and substantive.

At a higher management level where policy decisions are made, however, the evidence of costs and benefits seemed to matter far less. One oddity of current environmental regulation is the juxtaposition of the Executive Order requirement to undertake cost-benefit analysis with the requirement in many environmental laws to *ignore* costs in determining the appropriate standard. Many environmental laws, including the Clean Air Act, require that environmental standards be set to ensure the public health with an adequate margin of safety. EPA's interpretation, backed by Court decisions, is that costs are not to be considered when setting emissions standards under the Clean Air Act. Frequently, after the policy choice is made, however, a RIA is done to tote up costs and benefits. In a more rational world, a RIA would be done prior to decision-making so that the relative costs and benefits of alternative could inform decision-making.

The current approach to environmental regulation leads to some anomalous results. In setting the standard on NO<sub>x</sub> emissions for stationary sources, EPA analyzed three alternative standards. Of the three choices, EPA favored the middle standard. (This by the way is an example of a classic Washington strategy: position your preferred choice between two other alternatives, preferably extreme and unpopular alternatives, so that the preferred alternative looks like the reasonable middle ground.) EPA argued that the standard allowing the most emissions would not allow many areas to meet the NAAQS. The most stringent alternative was thought to be too expensive and would yield only slight improvement in the number of areas in attainment with the NAAQS over the middle alternative. However, the RIA revealed that, given one reasonable set of assumptions, the middle alternative was a local welfare minimum. In going from the least stringent alternative to one that was chosen, there was virtually no change in air quality benefits but a large increase in cost. Further tightening of the standard to get to the most stringent alternative resulted in a large cost increase but an even greater increase in benefits. Of course, there were many uncertainties in the modeling, both in terms of the science and the economics. What this result suggests to me is not that the middle alternative necessary was the worst choice,

but that environmental policy choices do not rely on the best available scientific and economic evidence. Policy choices are often made without regard to science and economic information both because of uncertainty in the underlying scientific and economic evidence and, more fundamentally, because the way that EPA interprets the law does not call or allow for such considerations. In the case of the NO<sub>x</sub> standards, though the law did not require a benefit/cost test, certain provisions could have been interpreted to be equivalent to targeting equal incremental social cost per unit change in air quality across areas.

The EPA recently ran into trouble in the Courts on these grounds. A recent Court of Appeals decision blocked the 1997 NAAQS rule as being unconstitutional. In the ruling, the Court stated that EPA lacked an "intelligible principle" for making choices of where to set the standard. The difficulty confronted by the EPA is that it is called upon to set standards that provide an adequate margin of safety for public health for non-threshold pollutants such as ozone and particulate matter for which any reductions down to zero emissions should yield health benefits. If costs are really immaterial, then zero is a defensible standard but any positive level looks *ad hoc*, which is what the Court found. Of course, in the political world, large costs imposed by new regulation certainly do matter. Imposing enormous costs by setting standards at zero would not likely last long either within the White House or in Congress.

No one likes to think that their actions will impose enormous costs on society, even when those costs come from promoting a worthy cause like cleaner air. Prior CEA staff analysis concluded that implementing the new NAAQS could cost around \$60 billion annually. For Los Angeles alone, using existing end of pipe control technology, meeting the new air quality standards would so expensive as to be practically infeasible. EPA's own analysis assumed constant marginal costs for reducing pollution rather than an upward sloping marginal cost as was indicated by existing data. By making the constant marginal cost assumption, EPA generated estimates of reasonable cost to attain the standard. This result was accomplished though only by making unreasonable assumptions at the outset.

### **Electricity Restructuring Policy**

A third area that I worked on while at CEA was the Administration's proposal for electricity restructuring. At first glance, it does not seem that electricity restructuring is fundamentally an environmental issue. Yet, the issues that generated the most intense discussion were environmental issues. The basic motivation for

electricity restructuring was the realization that electric generation is not a natural monopoly. Instead of regulating power generation, policy should encourage competition. Many states and the federal government are now actively pursuing deregulation on electric power generation. Electric utility regulation is largely the purview of states and the states have taken the lead on deregulation legislation. There is, however, a federal role in streamlining existing federal regulation to allow competition, address inter-state market issues, and define the role of federal power generating agencies like the Tennessee Valley Authority (TVA) and the Bonneville Power Administration (BPA) in a deregulated market.

One of most contentious issues in the Administration's electricity restructuring proposal was the Renewable Portfolio Standard (RPS). The RPS would set a requirement on all power generators to produce a certain percentage of their power from non-hydro renewable energy sources (wind, solar, or biomass energy). However, if the generator found it too expensive to produce the required renewable fraction, it could purchase permits from the Department of Energy. Proponents of a larger RPS argued that the Administration had to do more to reduce greenhouse gas emissions. Economists argued that the RPS was an expensive and inefficient solution. For example, the implied costs of reducing carbon via the RPS were well over \$100 per ton, far in excess of the Administration's own estimates of \$14 to \$23 per ton for costs of carbon reduction.

Like many fights in academia, this fight was especially bitter because so little was at stake. The Administration in 1998 had backed a 5.5% RPS. In 1999, backers wanted to push it higher, 7% or 8% or even 10%. Now beyond 6%, it is highly unlikely that anything will happen except the purchase of more permits from DOE. The revenue from the sale of permits goes into the Public Benefits Fund. Other revenue going into the Public Benefits Fund comes from a surcharge on electricity production. Total funds going into the Public Benefits Fund each year are capped. So, increases in revenue from permits are offset by a reduction in the electricity surcharge. The fight over 7% or 8% RPS is really a symbolic fight. In Washington, especially in the age of sound-bite politics, the most hard fought battles are often the ones with little substance.

## Conclusion

From my experience at CEA, I found that results from economic studies often were used in the policy debate, where "used" can be taken in both a good sense and a bad sense. On the positive side, there were "teachable moments" where decision-makers were open to various alternatives and a logical argument backed by evidence could carry the day. In these moments, simple economic theory and basic numbers were good ammunition and often persuasive. Also, methods developed by economists and results of economic studies permeate Washington. The requirement to do cost-benefit analysis for all major regulatory decisions is a case in point. On the negative side, however, I would have to conclude from my experience that economic analysis plays only a minor role in decision-making, at least in environmental policy in this Administration. Decisions are often made in crisis mode where there is little room for rational discourse. Economic logic and evidence is not so much used to make better choices but rather brought in where convenient to buttress a decision that has already been made. In environmental policy, there are legal impediments to having economic analysis play a major role, such as in the Clean Air Act where costs cannot be considered as a factor in setting standards. But even ignoring this, Washington runs according to political necessity not economic logic and there is not a neat one-to-one mapping between these. Over the longer-term, however, I remain convinced that economists can have a positive influence on environmental policy. There is a need for economists to discipline policy debates by supplying logic and evidence. Economists can also influence future decisions by pointing out where past policy choices have fallen short because they ignored economic logic or empirical realities.

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*Economic Valuation of Environmental Benefits and the Targeting of Conservation Programs: The Case of the CRP*, by Peter Feather, Daniel Hellerstein and LeRoy Hansen, Resource Economics Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Economics Report No. 778.

**Abstract:** The range of environmental problems confronting agriculture has expanded in recent years. As the largest program designed to mitigate the negative environmental effects of agriculture, the Conservation Reserve Program (CRP) has broadened its initial focus on reductions in soil erosion to consider other landscape factors that may also be beneficial. For example, preserving habitats can help protect wildlife, thus leading to more nature viewing opportunities. This report demonstrates how nonmarket valuation models can be used in targeting conservation programs such as the CRP. If the CRP, or some other conservation programs, could be targeted to provide more benefits to society for the same costs, these programs would use resources more efficiently.

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