

WILLIAM W. HOGAN

PERSONAL DATA

Born: 1944, Holyoke, Massachusetts
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 Harvard University
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EDUCATION

BS United States Air Force Academy, 1966
 MBA University of California, Los Angeles, 1967
 PhD University of California, Los Angeles, 1971

PROFESSIONAL EXPERIENCE

2025 - Raymond Plank Professor of Global Energy Policy (Emeritus), Harvard Kennedy School, Harvard University, Cambridge, Massachusetts
 2019 - 2025 Raymond Plank Research Professor of Global Energy Policy, Harvard Kennedy School, Harvard University, Cambridge, Massachusetts
 2006 - 2019 Raymond Plank Professor of Global Energy Policy, Harvard Kennedy School, Harvard University, Cambridge, Massachusetts
 2011- FTI Consulting, Boston, Massachusetts
 1999 - 2011 Director, LECG, LLC, Cambridge, Massachusetts
 1998 - 2006 Lucius N. Littauer Professor of Public Policy and Administration, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts
 1989 - 1999 Senior Advisor, Putnam, Hayes and Bartlett, Inc., Cambridge, Massachusetts
 1987 - 1998 Thornton Bradshaw Professor of Public Policy and Management, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts
 1982 - 1990 Chairman, Public Policy Program, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts
 1980 - 1997 Director, Putnam, Hayes and Bartlett, Inc., Cambridge, Massachusetts
 1978 - 1987 Professor of Political Economy, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts
 1978 - 1986 Director, Energy and Environmental Policy Center, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts
 1976 - 1978 Adjunct Professor of Research and Scholarship, Department of Engineering-Economic Systems and Department of Operations Research, Stanford University, Stanford, California; Executive Director, Energy Modeling Forum
 1975 - 1976 Deputy Assistant Administrator for Data and Analysis, Federal Energy Administration
 1974 - 1975 Director, Office of Quantitative Methods, Federal Energy Administration
 1973 - 1974 Acting Director, Modeling Division, Office of Energy Data and Analysis, Dept. of Interior
 1971 - 1973 Instructor, U.S. Air Force Academy, Department of Economics and Management
 1969 - 1971 PhD, Department of Quantitative Methods, Graduate School of Management, Univ. of California, Los Angeles; Chairman: Dr. Arthur Geoffrion; Dissertation: "Optimization and Convergence of Extremal Value Functions Arising from Structured Nonlinear Programs"
 1968-1969; 1975 Instructor, Associate Professor (part-time), George Washington University
 1967-1969 Operations Research Analyst, U.S. Air Force, Pentagon

HONORS

National Academy of Engineering, 2021

Adelman-Frankel Award, United States Association for Energy Economics, October 2011

Norges Handelshoyskole (Norwegian School of Economics), Doctor *Honoris Causa*, 2011

International Association for Energy Economics (IAEE), Award for Outstanding Contributions to the Profession, 2005

Contributor, 50th Anniversary Issue, Operations Research (50:1, January-February 2002)

President's Award, Institute for Operations Research and Management Sciences (INFORMS) for long-term research with significant impact and influence on society and public policy (2000)

Distinguished Service Award (2000), Center for Business and Government, John F. Kennedy School of Government, Harvard University

Best Paper Award (1997) The Energy Journal: "A Market Power Model with Strategic Interaction in Electricity Networks."

Distinguished Service Award for Service to the Electric Utility Industry (1995), Public Utility Research Center, University of Florida

Distinguished Service Award (1975), Special Award for Exceptional Service (1976), Federal Energy Administration

Alumni Award, Outstanding Doctoral Student, University of California, Los Angeles (1971)

Outstanding Cadet Award, Engineering Management, U.S. Air Force Academy (1966)

ACTIVITIES AND ORGANIZATIONS

Visiting Committee, Institute for Data, Systems, and Society, MIT, 2018-

Future of Energy, Harvard University: Energy and Environmental Policy, Co-Chair, 2008-2019

Management Science and Engineering Department, Stanford University: Visiting Committee 2002-2003

Journal of Regulatory Economics: Editorial Board, 2002-

Royal Society for the Encouragement of Arts, Manufactures & Commerce, London: Fellow, 2000-2004

National Regulatory Research Institute, Ohio State University, External Review Team, 1997-2001

Energy Economics: Editorial Board, 1996-

Electricity Journal: Editorial Advisory Board, 1994-

Resource and Energy Economics: Editorial Board, 1993-1998

H. John Heinz School of Public Policy and Management, Carnegie Mellon University: Advisory Board, 1992-2000

Electric Power Research Institute: Advisory Group for Economics, 1992-1993

Committee for Economic Development: Advisor, Design Committee on Energy and the Environment, 1990-1993

Project on Economic Reform in Ukraine: Director, 1990-1997

MIT Center for Technology, Policy and Industrial Development: Advisory Board, 1987-1996

National Research Council, Commission on Engineering and Technical Systems: Energy Engineering Board, 1986-1989

The Sawhill Commission (New York State) for the Investigation of the Public Power Option for the Long Island Lighting Company, 1986

Center for Acid Rain and Clean Air Policy Analysis, National Governors' Association: Board of Directors, 1985

International Association for Energy Economics: President, 1985

National Petroleum Council: Committee on U.S. Petroleum Refining, 1984-86

Harvard Real Estate and Planning Board: Faculty Advisory Council, 1984-2019

Gas Research Institute: Advisory Council, 1983-2000; Board of Directors, 1991-2000

Aspen Institute for Humanistic Studies: Energy Steering Committee, 1983-

Harvard Real Estate Corporation: Director, 1982-1983

The Energy Journal: Editorial Board, 1981-

Public Policy and Public Management Case Project: Editorial Board, 1979-1987

Operations Research: Editor, Energy and Environment, 1978-1982

Resources and Energy: Advisory Editor, 1979

National Center for Energy Systems Analysis: Advisory Board, 1979-1981

Argonne National Laboratories: Advisory Board, Energy and Environment Systems Division, 1979-1981

Undergraduate Mathematics Applications Project: Steering Committee, 1979-1981

Energy Modeling Forum, Chairman, Steering Committee, 1978-1987

Texas National Energy Modeling Project: National Advisory Board, 1978-1980

University of Texas, Center for Energy Studies: Advisory Panel, 1977-1979

International Association for Energy Economics (IAEE), 1978-

ORSA: Special Interest Group on Energy Application, Chairman, 1977-1978

Electric Power Research Institute: Supply and Demand Advisory Task Force, 1974-1976

The Mathematical Programming Society, 1971-

The Institute of Operations Research and Management Sciences (INFORMS), 1967-

STUDY GROUPS

Beyond LCOE External Advisory Board, Department of Energy, 2019

Task Force to Support the Quadrennial Energy Review, Secretary of Energy Advisory Board, 2014-2016

Committee on Accelerating Deployment of Clean Energy and Energy Efficiency Technologies, National Academy of Sciences Energy Study, 2013-2016

MIT Grid Study, 2009-2011

Harnessing Renewable Energy, 2009-2010

Populism and Natural Resources: An Energy Policy Agenda, Mossavar-Rahmani Center for Business and Government, Harvard Kennedy School, Harvard University, 2006-2009

Repsol YPF-Harvard Kennedy School Fellows Program, Director, 2002-2006

Initiative on the Future of Electricity, Edison Electric Institute, 1999

Independent Expert Review Panel, U. S. Energy Information Administration Review of the Economic Effects of the Kyoto Protocol, 1998

Electric Utility Market Reform Task Force, Massachusetts Dept of Energy and Resources, 1994-1995

Harvard Electricity Policy Group, Research Director, 1993-2023

Repsol YPF - Harvard Seminars in Energy Policy, Co-Chair, 1988-2019

Energy Modeling Forum Working Groups: Energy and the Economy (Chairman), 1976-1977; Coal in Transition, 1977-1978; Electric Load Forecasting, 1977-1979; Demand Elasticities (Chairman), 1978-1980; Oil and Gas Supply, 1979-1982; World Oil Models, 1980-1982; Energy Shocks, 1982-1984; Industrial Energy Demand, Conservation and Interfuel Substitution, 1984-1986; International Oil Supplies and Demands, 1989-1991.

Energy Efficiency: A New Agenda, Task Group, American Council for an Energy Efficient Economy, 1988

Harvard Study on the Future of Natural Gas 1984-1985

Diesel Impacts Study Committee, National Research Council, 1979-1981

Resources for the Future: Energy, the Next Twenty Years, sponsored by the Ford Foundation, 1978-1979

Modeling Resources Group, Committee on Nuclear and Alternative Energy Systems, National Academy of Sciences, 1976-1977.

BOOKS AND ARTICLES

Fundamentals Define the Constraints on Electricity Market Design (May 2023). Joint with Scott Harvey. Oxford Energy Forum.

Beyond The Crisis: Re-Thinking The Design Of Power Markets (March 8, 2023), Rapport du groupe académique international à la CRE « Au-delà de la crise ; repenser le marché électrique européen » Report for the Commission de Régulation de l’Energie, Europe.

Location Marginal Prices and Electricity Markets (October 17, 2022). Joint with Scott Harvey. NYISO FERC Submission (30 pages)

“Computation of Convex Hull Prices in Electricity Markets with Non-Convexities using Dantzig-Wolfe Decomposition,” with Panagiotis Andrianesis, Dimitris Bertsimas, and Michael C. Caramanis. *IEEE Transactions on Power Systems*, Volume: 37, Issue: 4, July 2022.

Electricity Market Design and Zero-Marginal Cost Generation (October 21, 2021). Forthcoming in Current Sustainable/Renewable Energy Reports. (22 pages) Published Version

“Strengths and Weaknesses of the PJM Market Model,” *Handbook on Electricity Markets*, Edited by Jean-Michel Glachant, Paul L. Joskow, and Michael G. Pollitt, Elgar Publishing, 2021.

Carbon Pricing in Organized Wholesale Electricity Markets (September 30, 2020) Comments for FERC Technical Conference, Docket No. AD20-14-000. (7 pages)

Transmission Investment Beneficiaries and Cost Allocation: New Zealand Electricity Authority Proposal (February 1, 2020) (34 pages).

“Cross-product Manipulation in Electricity Markets, Microstructure Models and Asymmetric Information,” (with Chiara Lo Prete, Bingyuan Liu and Jia Wang), *The Energy Journal*, Volume 40, Number 5, 2019.

“A Primer on Transmission Benefits and Cost Allocation.” *Economics of Energy & Environmental Policy*, March 2018.

“Best Electricity Market Design Practices: In My View.” *IEEE Power and Energy*, January 2018.

“Priorities for the Evolution of an Energy-Only Electricity Market Design in ERCOT” (with Susan Pope), May 9, 2017.

The Power of Change: Innovation for Development and Deployment of Increasingly Clean Electric Power Technologies (committee member, National Academies of Science, Engineering, and Medicine book), September 2016.

“Virtual Bidding and Electricity Market Design.” *The Electricity Journal*, June 2016.

“Co-Optimization of Power and Reserves in Dynamic T&D Power Markets with Nondispatchable Renewable Generation and Distributed Energy Resources” (co-author with Michael Caramanis, Elli Ntakou, Aranya Chakraborty and Jens Schoene), *Proceedings of the IEEE*, April 2016.

“Electricity Markets and the Clean Power Plan,” *The Electricity Journal*, November 2015.

"A Cleaner Energy System: Renewable Energy and Electricity Market Design [In My View]," *IEEE Power & Energy Magazine*, July 2015.

"Electricity Market Design and Efficient Pricing: Applications for New England and Beyond," *The Electricity Journal*, August-September 2014.

"Electricity Scarcity Pricing Through Operating Reserves," *Economics of Energy & Environmental Policy*, Vol. 2, Issue 2, September 2013.

"Financial Transmission Rights: Point-to-Point Formulations," chapter in Rosellón, Juan and Tarjei Kristiansen, ed., *Financial Transmission Rights: Analysis, Experiences and Prospects*. London: Springer, 2013.

"Multiple Market-Clearing Prices, Electricity Market Design and Price Manipulation," *The Electricity Journal*, Vol. 25 Issue 4, May 2012.

"Towards a Combined Merchant-Regulatory Mechanism for Electricity Transmission Expansion," with Juan Rosellón and Ingo Vogelsang, *Journal of Regulatory Economics*, Vol. 38, No. 2, October 2010.

"Electricity Wholesale Market Design in a Low-Carbon Future," chapter in Mosele, Boaz, Jorge Padilla and Richard Schmalensee, *Harnessing Renewable Energy in Electric Power Systems: Theory, Practice, Policy*. Washington, DC: RFF Press, 2010.

"Fairness and Dynamic Pricing: Comments," William W. Hogan, *The Electricity Journal*, Vol. 23 Issue 6, July 2010.

The Natural Resources Trap: Private Investment without Public Commitment, co-edited by William Hogan and Federico Sturzenegger, Cambridge, Mass.: MIT Press, June 2010.

"Electricity Market Reform," William W. Hogan, *Harvard China Review*, Volume Six, No. 1, January 2010.

"Electricity Market Structure and Infrastructure," in *Acting in Time on Energy Policy*, Kelly Sims Gallagher, editor, Brookings Institution Press, 2009.

Comments on "Cost Reductions, Cost Padding, and Stock Market Prices: The Chilean Experience with Price-Cap Regulation," in *Economía: Journal of the Latin American and Caribbean Economic Association*, Vol. 8, No. 2, 2008.

"Energy," Essay in *National Strategy Forum Review*, published by The National Strategy Forum, Inc, Summer 2008.

"Market-based Transmission Investments and Competitive Electricity Markets," in *Electric Choices: Deregulation and the Future of Electric Power*, Andrew N. Kleit, ed., Rowman & Littlefield Publishers, 2007.

"Stability of Supply Function Equilibria: Implications for Daily versus Hourly Bids in a Poolco Market," with Ross Baldick. *Journal of Regulatory Economics*, Vol. 30, No. 2, August 2006.

"Transmission Market Design," in *Electricity Deregulation: Where To From Here?*, James Griffin, editor, University of Chicago Press, 2005.

"Resource Adequacy and Electricity Markets," *EnergyBiz*, September-October, 2005.

"Shedding Light," Op-Ed in *The Wall Street Journal*, April 19, 2004.

"Electricity Is a Federal Issue," Op-Ed in The Wall Street Journal, August 18, 2003

"FERC Knows What To Do," The Energy Daily, May 20, 2003.

"Comment" on J. Villar and H. Rudnick, "Hydrothermal Market Simulator Using Game Theory: Assessment of Market Power," IEEE Transactions on Power Systems, November 2003.

"Making Markets in Electric Power," Governance Amid Bigger, Better Markets, John Donahue and Joseph Nye, editors, Brookings Institution Press, Washington, D.C., 2002.

"Energy Modeling for Policy Studies," Operations Research, Fiftieth Anniversary Issue, January- February 2002.

"Electricity Market Restructuring: Reforms of Reforms," Journal of Regulatory Economics, January, 2002 .

"Market-Based Transmission Investments and Competitive Electricity Markets," in Avoiding the Pitfalls: Lessons for Electricity Restructuring, Andrew N. Kleit, editor, The Independent Institute, Oakland, CA, 2002.

"The Slippery Slope of Socialization," Public Utilities Fortnightly , December 1, 2001

"The California Electricity Meltdown," Harvard Magazine, September- October, 2001.

"Regional Transmission Organizations: Millennium Order on Designing Market Institutions for Electric Network Systems," Electricity Economics: Policies, Einar Hope, Leonid Melamed, and Mikhail Lychagin, editors, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia, 2001.

"Competencia en Mercados Eléctricos Mayoristas," Reforma Estructural del Sector Eléctrico, Ramiro Tovar Landa, compilador, Instituto Tecnológico Autónomo de México (ITAM), Mexico D.F., Mexico, 2000.

"Regional Transmission Organizations: Market Institutions for Electric Network Systems," The Utilities Project: the Impact of Competition, Montgomery Research/ PriceWaterhouseCoopers, San Francisco, 2000.

"The Power of Competition," RSA Journal, Royal Society for the Encouragement of Arts, Manufactures & Commerce, London, UK, February 2000.

"A Concurrent Auction Model for Transmission Congestion Contracts," Energy and Environmental Policy Modeling, John Weyant, editor, Kluwer Academic Publishers, 1999.

"Getting the Prices Right in PJM: What the Data Teach Us," Electricity Journal, Vol. 11, No. 7, August-September, 1998.

"ISO Developments in the United States," Power Economics, Vol. 2, No. 5, June 1998.

"Nodes and Zones in Electricity Markets: Seeking Simplified Congestion Pricing," Designing Competitive Electricity Markets, Hung-po Chao and Hillard Huntington, editors, Kluwer Academic Publishers, 1998.

"WEPEX: What's Wrong With Least Cost?" Public Utilities Fortnightly, January 1, 1998.

"A Market Power Model with Strategic Interaction in Electricity Networks," The Energy Journal, Vol. 18, No. 4, 1997.

Transmission Rights, Through the Looking Glass: A False Dichotomy Between Active and Passive Trading," The Electricity Journal, Vol. 10, No. 8, October 1997.

"Market Power and Strategic Interaction in Electricity Networks," (with Judith Cardell and Carrie Cullen Hitt), Resource and Energy Economics, Vol. 19, 1997.

"Transmission Capacity Reservations Implemented Through a Spot Market with Transmission Congestion Contracts," with Scott M. Harvey and Susan L. Pope, Electricity Journal, Vol. 9, No. 9, November 1996.

"Predictions, Prescriptions, and Policy: Lessons from the Energy Record," in The Energy Crisis: Unresolved Issues and Enduring Legacies, David Lewis Feldman, editor, Johns Hopkins University Press, 1996.

"Using Mathematical Programming for Electricity Spot Pricing" (with E. Grant Read and Brendan J. Ring), Energy Models for Policy and Planning, International Transactions of Operational Research, Vol.3, No. 3/4, 1996.

"Evaluations of Alternatives for Power System Coordination and Pooling in a Competitive Environment," (with Hugh Rudnick and Ruy Varela), IEEE Transactions on Power Systems, 1996.

"Markets in Real Electric Networks Require Reactive Prices," in Readings in Pricing and Technology, Riaz Siddiqi and Michael Einhorn, editors, Kluwer Academic Publishers, 1996.

"A Wholesale Pool Spot Market Must Be Administered by the Independent System Operator: Avoiding the Separation Fallacy," Electricity Journal, December 1995.

"Electricity Transmission and Emerging Competition," Public Utilities Fortnightly, July 1, 1995.

"A Breakthrough By Any Definition," Commentary, Energy Daily, May 31, 1995.

"To Pool or Not To Pool: A Distracting Debate," Public Utilities Fortnightly, January 1, 1995.

"Efficient Direct Access: Comments on the California Blue Book Proposal," Electricity Journal September, Vol. 7, No. 7, 1994.

"An Efficient Electricity Market: Using a Pool to Support *Real* Competition," (with Don Garber and Larry Ruff), Electricity Journal, September, Vol. 7, No. 7, 1994.

"Contract Networks for Electric Power Transmission," in From Regulation to Competition: New Frontiers in Electricity Markets, Michael Einhorn, editor, Kluwer Academic Publishers, 1994.

"Markets in Real Electric Networks Require Reactive Prices," Energy Journal, Vol.14, No.3, 1993.

"Electric Transmission: A New Model for Old Principles," Electricity Journal, March 1993.

"OECD Oil Demand Dynamics: Trends and Asymmetries," Energy Journal, Vol. 14, No. 1, 1993.

"Cross-Border Trading and Transmission Networks: A Model for Competition in Natural Gas and Electricity Grids," in Energy and Resources Law '92, IBA Section on Energy & Natural Resources Law, London, International Bar Association, 1992.

"Contract Networks for Electric Power Transmission," Journal of Regulatory Economics, Vol. 4, September 1992.

"An Efficient Concurrent Auction Model for Firm Natural Gas Transportation Capacity," Information Systems and Operational Research, Vol 30, No. 3, August 1992.

"Energy and Information Network Infrastructures." Building Information Infrastructure, Brian Kahin editor, McGraw Hill, 1992.

"Economic Reforms in the Sovereign States of the Former Soviet Union," Brookings Papers on Economic Activity, William G. Brainard and George L. Perry, editors, Washington, D.C., Vol. 2, 1991.

"Will Demand Increase? Evaluation and Prospects of the Relationships between Economic Growth, Energy Policies, and the Demand for Oil ." Revue de l'Energie, Paris, No. 42, August 1991.

"Productivity Trends and the Costs of Reducing CO2 Emissions," (with Dale Jorgenson), Energy Journal, Vol. 12, No. 1, 1991.

"How Far Back Should Prudence Tests Reach?" (with A. Lawrence Kolbe), Public Utilities Fortnightly, January 15, 1991.

"Modeling Interactions," (with Shailendra C. Parikh), Energy, Vol. 15, No. 3/4, March/April, 1991.

"Comment on Manne and Richels, 'CO₂ Limits: An Economic Analysis for the USA,'" Energy Journal, Vol. 11, No. 2, April 1990.

"Including Unbundled Demand-side Options in Electric Utility Bidding Programs," (with Charles J. Cicchetti), Public Utilities Fortnightly, June 8, 1989. Also in Competition in Electricity: New Markets and New Structures, eds., James Plummer and Susan Troppman, Public Utilities Reports, Arlington, VA, 1993.

"A Dynamic Putty - Semi-Putty Model of Aggregate Energy Demand," Energy Economics, Vol. 11, No. 1, January 1989.

"Oil Tariff Policy: An Overview," (with Harry Broadman), Energy Systems and Policy, Vol. 12, 1988.

"Is an Oil Tariff Justified? The Numbers Say Yes" (with Harry Broadman), Energy Journal, Vol. 9, No. 3, 1988.

Lower Oil Prices: Mapping the Impact (with Bijan Mossavar-Rahmani et al.), Harvard University Energy and Environmental Policy Center, 1988.

Energy Security Revisited (with Bijan Mossavar-Rahmani), Harvard University Energy and Environmental Policy Center, September 1987.

"The Boundaries Between Regulation and Competition." In Drawing the Line on Natural Gas Regulation: Harvard Study on the Future of Natural Gas, Joseph Kalt and Frank Schuller, editors, Quorum Books, Greenwood Press, 1987.

"Energy Policy Modelling in the USA: Competing Societal Alternatives," (with Martin Greenberger.) In The Politics of Energy Forecasting, Thomas Baumgartner and Atle Midttun, ed., Oxford University Press, 1987.

"Energy Security and Oil Market Risk Analysis" (with Paul N. Leiby.) In Energy Decisions for the Future: Proceedings of the Eighth Annual International Conference of the IAEE, Mitsuru Miyata and Kenichi Matsui, editors, Tokyo, 1986.

"Patterns of Energy Use." In Energy Conservation: Successes and Failures, John C. Sawhill and Richard Cotton, editors, The Brookings Institute, 1986.

"Energy and Economy: Global Interdependences," Energy Journal, Vol. 6, No. 4, 1985.

"Integrated Fuel and Investment Planning: Methods and Process" (with Charles Mann, Susan Manning, and Darrell Smith.) In Models in the Decision Making Process: Planning Under Uncertainty, Andrew Kydes, editor, North-Holland, 1985.

"Energy, the Economy, and Oil Security." In Improving U.S. Energy Security, Richard Gonzales, et al, editors, Ballinger Publishing Co., 1985.

"Energy Policy." In Energy Resources and National Policy: The Reagan Approach, Paul R. Portney, editor, Urban Institute Press, 1984.

"Oil Stockpiling: Help Thy Neighbor," Energy Journal, Vol. 4, No. 3, 1983.

"Methods and Algorithms for Combining Energy Models: Optimization in a Network of Process Models", (with John Weyant). In Energy Models and Studies, Studies in Management Science and Systems, B. Lev, editor, Vol. 20, 1983.

Caught Unawares: the Energy Decade in Retrospect, with Martin Greenberger, et al., Ballinger Publishing Company, 1983.

"Alternatives to Transfer of Large-Scale Models." In Large Scale Energy Models, Robert M. Thrall, Russell G. Thompson, and Milton L. Holloway, editors, Westview Press, 1983.

"Policies for Oil Importers." In OPEC Behavior and World Oil Prices, J. Griffin and D. Teece, editors, George Allen and Unwin, London, 1982.

"On Convergence of the PIES Algorithm for Computing Equilibria," with B. H. Ahn, Operations Research, Vol. 30, No. 2, 1982.

Decision Analysis of Regulating Diesel Cars, National Academy Press, 1982.

"Combined Energy Models." In Advances in the Economics of Energy and Resources, Vol. 4, John. R. Moroney, editor, JAI Press, 1982.

"Energy and Security Policy." In Toward A New U.S. Industrial Policy?, Michael L. Wachter and Susan M. Wachter, editors, University of Pennsylvania Press, 1981.

"Import Management and Oil Emergencies." In Energy and Security, David Deese and Joseph Nye, editors, Ballinger Publishing Co., 1981.

"Aggregate Elasticity of Energy Demand," with the EMF Working Group, The Energy Journal, Vol. 2, No. 2, 1981.

"Gasoline, Prices, Taxes and Demand." In The Dependence Dilemma: U.S. Gasoline Consumption and America's Security, Daniel Yergin, editor, Center for International Affairs, Harvard University, 1980.

"Economic Growth and Higher-Priced Energy." In Energy in America: Fifteen Views, S. Ramo, editor, Center for the Study of the American Experience, University of Southern California, 1980.

"Alternatives to Transfer of Large-Scale Models," Simulation, April 1980.

Background Papers for Energy: The Next Twenty Years, contributor, H. Landsberg, editor, Ballinger Press, 1980.

"Capital Energy Complementarity in Aggregate Energy-Economic Analysis," Resources and Energy, Vol. 2, North-Holland Publishing Company, 1979.

Energy: The Next Twenty Years, contributor. A Ford Foundation/Resources for the Future Report, Ballinger Press, 1979.

Energy Information: Description, Diagnosis, and Design, editor and contributor. Stanford Institute for Energy Studies, Stanford University, 1979.

"Energy and Economic Growth." In Energy Conservation and Public Policy, John Sawhill, editor, Prentice-Hall, 1979.

"The Energy Modeling Forum: A Communication Bridge," in K.B. Haley, Operational Research, '78, North-Holland Publishing Company, 1979.

"Policy Modeling for Energy Decision," The Stanford Engineer, Stanford University, Winter 1978.

"Energy Modeling: Building Understanding for Better Use," Proceedings, Second Lawrence Symposium on Systems and Decision Sciences, 1978.

"Energy-Economy Interactions: The Fable of the Elephant and the Rabbit?" with Alan S. Manne. In Modeling Energy-Economy Interactions - Five Approaches, Charles J. Hitch, editor, Resources for the Future Research Papers, 1977. Also in Advances in the Economics of Energy and Resources, Robert S. Pindyck, editor, JAI Press, 1978.

"Energy Policy Models for the National Energy Outlook," with James Sweeney and Michael Wagner, TIMS Studies in Management Sciences, Vol. 10, North-Holland Publishing Company, 1978.

"Project Independence Evaluation System: Structure and Algorithms." In Mathematical Aspects of Production and Distribution of Energy. Proceedings of Symposium in Applied Mathematics, edited by P.D. Lax, Vol. 21, 1977.

"The BOXSTEP Method for Large-Scale Optimization," with R.E. Marsten and H.W. Blankenship. Operations Research, Vol. 23, No. 3, 1976.

"Norm Minimizing Estimation and Unbiasedness," Econometrica, Vol. 44, No. 3, 1976.

"Optimizing the Procurement of Aviation Fuels," with Larry Austin, Management Science, Vol. 22, No. 5, 1976.

"Energy Policy Models for Project Independence," Computers and Operations Research, Vol. 2, Pergamon Press, 1975.

"Toward the Development of an Equilibrium Capital Market Model Based on Semivariance," (with J.S. Warren), Journal of Financial and Quantitative Analysis, Vol. 9, January 1974.

"Applications of a General Convergence Theory for Outer Approximation Algorithms," Mathematical Programming, Vol. 5, 1973.

"Point-to-Set Maps in Mathematical Programming," SIAM Review, July 1973.

"Directional Derivatives for Extremal Value Functions with Applications to the Completely Convex Case," Operations Research Vol. 21, No. 1, 1973.

"The Continuity of the Perturbation Function of a Convex Program," (technical note) Operations Research, Vol. 21, No. 1, 1973.

Computation of the Efficient Boundary in the E-S Portfolio Selection Model," (with J.W. Warren), Journal of Financial and Quantitative Analysis, Vol. 7, September 1972.

"Coordination of Two-Level Organizations with Multiple Objectives," (with A. Geoffrion.) In Techniques of Optimization, edited by A.V. Balakrishnan, Academic Press, 1972.

"Comment on: Klymov G.P., 'Minimisation d'une fonctionnelle convexe continue donnée sur une multiplicité convexe compacte de l'espace vectoriel topologique.'" Bulletin de la Classe des Sciences, May 1971.

SELECTED RECENT WORKING PAPERS AND OTHER DOCUMENTS

Selected recent works among many available on Professor Hogan's website:

<http://www.whogan.com>

"Climate Policy and the Green Agenda: Could Nordhaus be Right?," IAEE Webinar Presentation, January 17, 2022.

"Electricity Market Design and Zero-Marginal Cost Generation," Prepared for Current Sustainable/Renewable Energy Reports, October 2021.

Strengths and Weaknesses of the PJM Market Model. Invited Chapter for Handbook on the Economics of Electricity. November 26, 2019.

Cross-Product Manipulation in Electricity Markets: Microstructure Models and Asymmetric Information (with Chiara Lo Prete, Bingyuan Liu and Jia Wang). January 2019.

Embracing Merchant Transmission Investment (with Martina Lindovska, Jason R.H. Mann and Susan L. Pope). October 15, 2018.

An Efficient Western Energy Imbalance Market with Conflicting Carbon Policies, September 28, 2017.

Carbon Prices, Preferences, and the Timing of Uncertainty (with Gernot Wagner). Work in progress, April 26, 2017.

Potential Arbitrage Revenue of Energy Storage Systems in PJM During 2014 (with Mauricio Salles and Michael Aziz). December 6, 2015.

Electricity Markets and the Clean Power Plan, September 21, 2015.

Time-of-Use Rates and Real-Time Prices. August 23, 2014.

Refunds of Refunds. April 7, 2014.

Electricity Market Design Flaws and Market Manipulation. February 3, 2014.

CAISO Energy Imbalance Market Straw Proposal: Comments. June 26, 2013.

Back Cast of Interim Solution B+ to Improve Real-Time Scarcity Pricing Through Operating Reserves. March 22, 2013.

Financial Transmission Rights, Revenue Adequacy and Multi-Settlement Electricity Markets. March 18, 2013.

Electricity Scarcity Pricing Through Operating Reserves: An ERCOT Window of Opportunity. November 1, 2012.

Electricity Market Design: Financial Transmission Rights, Up To Congestion Transactions and Multi-Settlement Systems. July 16, 2012.

Multiple Market-Clearing Prices, Electricity Market Design and Price Manipulation. March 31, 2012.

The Future of the Electric Grid: An Interdisciplinary MIT Study, December 2011. Study Participant.

Electricity Market Reform: Market Design and Extended LMP. NHH Workshop on Pricing in Deregulated Energy Markets presentation, Voss, Norway. November 28, 2011.

Energy Security and Energy Policy, Energy: Transition to a Sustainable Future presentation, part of the 2011 Industrial Physics Forum, Nashville, TN, October 31, 2011.

Allocating Costs Commensurate with Transmission Benefits, Northeast Energy and Commercial Association presentation, Boston. October 13, 2011.

Electricity Market Reform: Market Design and the Green Agenda Stockholm, 34th IAEE International Conference presentation. June 21, 2011.

Electricity Market Reform: Market Design and Extended LMP. The Economics of Energy Markets presentation, Toulouse, France. June 16, 2011.

Electricity Market Reform: Market Design and Resource Adequacy. The Economics of Energy Markets presentation, Toulouse, France. June 15, 2011.

Transmission Benefits and Cost Allocation. HEPG Paper. May 31, 2011.

"McCullough's Critique of the New York Electricity Market," William W. Hogan and Scott Harvey, a report for NYISO. December 22, 2009.

"Regulation of electricity transmission investment in Italy," William W. Hogan, Thomas-Olivier Leautier, Guido Cervigni, and Dmitri Perekhodtsev, a report for TERN, July 2009.

"Electricity Market Reform: APPA's Journey Down the Wrong Path," John Chandley and William W. Hogan, supported by the COMPETE Coalition, May 2009.

"Texas Nodal Market Design: Observations and Comments," Presentation, ERCOT Energized Conference, Austin, TX. May 2, 2008.

"Electricity Market Design: Coordination, Pricing and Incentives," Presentation ERCOT Energized Conference, Austin, TX. May 2, 2008.

"Electricity Market Design: Market Models for Coordination and Pricing," Energy Information Administration Conference, Washington, DC, April 6-8, 2008.

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Attachment B: "Comments on the Congestion Management Proposal of the California ISO," (with Scott M. Harvey.)

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SPEECHES, CONFERENCES AND OTHER ACTIVITIES

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, June 2019.

Speaker, China Electric Power Research Institute, Beijing, June 2019.

Speaker, National Energy Administration of China, Beijing, June 2019.

Speaker, State Grid Corporation of China, Beijing, June 2019.

Panelist, Greening Investments in BRI Countries: Opportunities and Challenges, Tsinghua University, Beijing, June 2019.

Speaker, China Power Market International Summit, Beijing, June 2019.

Panelist, WIRES retreat, Boston, MA, May 2019.

Keynote, EUCI Wholesale Power Markets' Price Formation conference, Philadelphia, PA, May 2019.

Panelist, Skadden Energy Conference, Washington, DC, April 2019.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Half Moon Bay, CA, March 2019.

Speaker, Yes Energy User Group Summit, Boulder, CO, February 2019.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Palm Beach, FL, December 2018.

Keynote, Platts 11th Annual Nodal Trader Conference, New York, NY, October 2018.

Panelist, World Bank, Washington, DC, September 2018.

Panelist, IAEE conference, Groningen, Netherlands, June 2018.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, June 2018.

Panelist, Energy Bar Association, Washington, DC, June 2018.

Panelist, Skadden Energy Conference, Washington, DC, April 2018.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Washington, DC, March 2018.

Speaker, Yes Energy User Group Summit, Boulder, CO, March 2018.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Palm Beach, FL, January 2018.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Calgary, AB, October 2017.

Keynote, Gas and Power Institute, Houston, TX, September 2017.

Panelist, The Future of Power Markets in a Low Marginal Cost World, Washington, DC, August 2017.

Speaker, Public Utility Commission of Texas, Austin, TX, August 2017.

Keynote, Chile Energy Day, Washington, DC, June 2017.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, June 2017.

Panelist, Edison Electric Institute convention, Boston, MA, June 2017.

Panelist, Federalist Society “State ‘Around Market’ Action and FERC: The End of Competitive Wholesale Electric Markets?” conference, Washington, DC, April 2017.

Keynote speaker, EUCI “Price Formation Issues in Wholesale Energy Markets” conference, Baltimore, MD, April 2017.

Panelist, Skadden Energy Conference, Washington, DC, March 2017.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Savannah, GA, March 2017.

Speaker, Enel Group Foundation Talks, Rome, January 2017.

Panelist, Hawaii International System Science Conference, Waikoloa, HI, January 2017.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Scottsdale, AZ, December 2016.

Panelist, National Conference of State Legislatures Capitol Forum, December 2016.

Moderator, New England Legal Foundation CEO Forum, Boston, MA, December 2016.

Distinguished Speaker Series, MIT Energy Initiative, November 2016.

Moderator, Platts Annual Nodal Trader Conference, New York, NY, October 2016.

Panelist, Organization of PJM States annual meeting, October 2016.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Washington, DC, October 2016.

Panelist, Institute for Data, Systems, and Society, MIT, September 2016.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, June 2016.

Panelist, “Designing Markets for a Decarbonizing Power System,” MIT Energy Institute, Cambridge, MA, May 2016.

Panelist, Electric Power Supply Association annual meeting, Chicago, IL, April 2016.

Keynote Speaker, National Capitol Area Chapter, United States Association for Energy Economics, April 2016.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Washington, DC, March 2016.

Speaker, FERC Legacy Series, Washington, DC, February 2016.

Panelist, Energy Mexico 2016, Mexico City, January 2016.

Speaker, UCLA IPAM workshop, Los Angeles, CA, January 2016.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Palm Beach, FL, December 2015.

Keynote speaker, MIT Center for Energy and Environmental Policy Research workshop, Cambridge, MA, November 2015.

Panelist, New England Energy Policy Summit, Cambridge, MA, October 2015.

Panelist, EUCI conference, Cambridge, MA, September 2015.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Washington, DC, June 2015.

Panelist, Skadden Energy Roundtable, Washington, DC, June 2015.

Speaker, Energy Bar Association, Newark, NJ, June 2015.

Keynote speaker, Associated Electric Cooperative annual meeting, Branson, MO, June 2015.

Panelist, A Symposium on Market Power and Market Manipulation in Energy Markets, Washington, DC, May 2015.

Speaker, Workshop on the Analysis and Management of Energy and Environmental Policy, Cambridge, MA, April 2015.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Half Moon Bay, CA, March 2015.

Speaker, Symposium on Mexico's Energy Reforms, Tufts University, Medford, MA, February 2015.

Speaker, Harvard National Model United Nations, Boston, MA, February 2015.

Speaker, EU Electricity Markets for Renewable Integration workshop, DIW Berlin, January 2015.

Panelist, Energy Bar Association meeting, Washington, DC, January 2015.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, New Orleans, LA, December 2014.

Keynote speaker, Platts Nodal Trader Conference, New York, NY, October 2014.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, October 2014.

Speaker, USAEE Breakfast Energy Series of Talks, Washington, DC, July 2014.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, June 2014.

Panelist, NYISO 2014 Energy Conference, New York, NY, June 2014.

Panelist, Restructuring the Electricity Sector in Japan, Brookings Institution, March 2014.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Santa Monica, CA, February 2014.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Tucson, AZ, December 2013.

Panelist, NARUC annual conference, Orlando, FL, October 2013.

Panelist, EUCI Scarcity Pricing Conference, Baltimore, MD, November 2013.

Panelist, NECA, Power Markets Conference, Westborough, MA, October 2013.

Keynote speaker, Platts Nodal Trader Conference, New York, NY, October 2013.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, September 2013.

Keynote speaker, Nexant User Conference, San Diego, CA, September 2013.

Panelist, Aspen Energy Forum, Aspen, CO, July 2013.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Calgary, AB, June 2013.

Speaker, Electricity Market Design on Two Sides of the Atlantic, CEEPR, MIT, May 2013.

Panelist, Austin Electricity Conference, April 2013.

Panelist, Gulf Coast Power Association, Houston, TX, April 2013.

Speaker, Skadden Enforcement and Compliance Conference, Washington, DC, March 2013.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Dana Point, CA, March 2013.

Speaker, 40th Annual Public Utilities Research Center conference, University of Florida, Gainesville, February 2013.

Keynote speaker, The Economics of Energy Markets Conference, Toulouse, France, January 2013.

Speaker, International Experience in Transmission Planning and Delivery conference, Imperial College, London, UK, January 2013.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Washington, DC, December 2012.

Speaker, International Association of Energy Economics conference, Austin, TX, November 2012.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, October 2012.

Speaker, Energy Compliance Network, Houston, TX, October 2012.

Speaker, Australian Competition and Consumer Commission regulatory conference, Brisbane, July 2012.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, June 2012.

Speaker, Geopolitics of Natural Gas Workshop, Baker Institute, Rice University, Houston, TX, May 2012.

Speaker, Weston Roundtable Series, University of Wisconsin, Madison, WI, April 2012.

Speaker, Pressing Issues in World Energy Policy, University of Florida, Gainesville, FL, March 2012.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Santa Monica, CA, February 2012.

Speaker, Projects & Money 2012 conference, New Orleans, LA, January 2012.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Dallas, TX, December 2011.

Speaker, NHH Workshop on Pricing in Deregulated Energy Markets, Voss, Norway, November 2011.

Panelist, BP/Harvard Kennedy School Symposium on Energy, Climate and Security Policy. Cambridge, MA, November 2011.

Speaker, Energy: Transition to a Sustainable Future, part of 2011 Industrial Physics Forum, Nashville, TN, October 2011.

Keynote speaker, Independent Oil Marketers Association of New England, Westborough, MA, October 2011.

Conference Co-Chair and panelist, Harvard Electricity Policy Group Plenary Session, Nashville, TN, September 2011.

Panelist, Aspen Energy Policy Forum, Aspen, CO, July 2011.

Panelist, "Institutions, Efficiency and Evolving Energy Technologies," International Association for Energy Economics, June 2011.

Keynote speaker, The Economics of Energy Markets Conference, Toulouse, France, June 2011.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Washington, DC, May 2011.

Panelist, "EPRG Spring Research Seminar: Renewable Energy Policy," Robinson College, University of Cambridge, UK.

Panelist, "Overcoming Barriers to Smart Grids & New Energy Services," University of Texas, Austin, TX.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Rancho Palos Verdes, CA, February 2011.

Moderator, "New Realities: Russia's Natural Gas Sector in Light of Shale Gas and LNG Advances," Russian Energy Conference, Harvard University, December 2010.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Tucson, AZ, December 2010.

Panelist, "Are the Wholesale Power Markets Delivering Benefits – An Open Forum Discussion," Northeast Energy and Commerce Association "Looming Changes in ISO New England's Power Markets" conference, November 2010.

Keynote Speaker, Boston Cleantech Venture Day, "Electricity Market Reform: Market Design, Smart Pricing and the Green Agenda," Boston, MA, November 2010.

Panel moderator, Chasing the Balance: Our Energy Future, Harvard Business School, October 2010.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, October 2010.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Santa Monica, CA, May 2010.

Panelist, "Fair Pricing: A Conference on Ethics and Dynamic Pricing," Rutgers Business School, Newark, NJ, April 9, 2010.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Santa Monica, CA, February 2010.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Austin, TX, December 2009.

Speaker, Singapore Electricity Roundtable, "Competitive Electricity Markets—Trends and Developments," Singapore, November 17, 2009.

Speaker, Exelon/Energy Bar Association workshop on Scarcity Pricing, Washington, DC, October 16, 2009.

Speaker, MIT Operations Research Center Seminar Series, October 15, 2009.

Keynote Speaker, National Energy Policy Institute conference on "Power for the 21st Century: Reinventing America's Power Grid," Tulsa, OK, October 7, 2009.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, October 2009.

Speaker, Elforsk Market Design and SAEE conference, "Design of Competitive Electricity Markets, Stockholm, Sweden, September 17-18, 2009.

Speaker, EUCI Conference on "FTRs – Where are We Now?," Washington, D.C., July 2009.

Speaker, White House Council on Environmental Quality, Washington, D.C., July 2009.

Lecturer, Infrastructure in a Market Economy, Harvard Kennedy School, Cambridge, MA, July 2009.

Speaker, Aspen Institute: 2009 Energy Policy Forum, "The Goals: An Electricity Grid for 21st Century," July 2009.

Conference Co-Chair, Harvard Electricity Policy Group 55th Plenary Session, Cambridge, MA, May 2009.

Panelist, "Scarcity Pricing and Solutions," Exelon Power Team, Kennett Square, PA, May 2009.

Panelist, "Disrupting the Status Quo in Electric Energy Management," Boston University, Brookline, MA, May 2009.

Presenter, "Smart Grid Regulation," GE Energy, Atlanta, GA, May 2009.

Keynote speaker, "Stimulating Energy Symposium", Harvard University, Cambridge, MA, May 2009.

Panelist, "Regulation and Electricity Markets," Western Power Trading Forum, New York, NY, April 2009.

Press release of study: Alternative Power Market Proposals Reflect Fundamental Misunderstandings of RTO Markets, FERC, Washington, DC, April 2009.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, La Jolla, CA, March 2009.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Atlanta, GA, December, 2008.

Panelist, "Energy Policy and Energy Interdependence," Hudson Institute, Washington, DC, Nov. 18, 2008.

Moderator, "Challenges in Energy Law and Litigation," LECG XPRT Forum, Santa Barbara, CA, November 14, 2008.

Participant, "Dubai, Summit on the Global Agenda," Dubai, United Arab Emirates, November 7-9, 2008.

Panelist, "NECA 2008 Power Markets Conference, Westboro, MA, October 30, 2008.

Panelist, "Energy Policy Challenges: Is the Past Prologue?," Resources for the Future, Washington, DC, October 29, 2008.

Participant, Harvard University Sustainability Celebration with Harvard President Drew Faust and Al Gore, Cambridge, MA, October 22, 2008.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Chicago, IL, October, 2008.

Panelist, "Powering the Future: Key Energy Issues for the Next Administration," Technology Policy Institute, Washington, D.C., September 26, 2008.

Steering Committee Co-Chair and Panelist, Harvard Kennedy School workshop, "Acting in Time on Energy Policy," Cambridge, MA, September 18-19, 2008.

Speaker, NYISO Annual Board Retreat, Rye, NY, September 14, 2008.

Keynote Presenter, PSEG Executive Session, "Electricity Market Design: Regulation and Market Reforms," Newark, NJ, August 11, 2008.

Speaker, Aspen Institute: 2008 Energy Policy Forum, "Climate Change and the Electricity Sector," July 2008.

Panelist, "Advancing Sustainability in the Oil and Gas Industry," World Petroleum Congress, Madrid, Spain, July 2, 2008.

Keynote Presenter, IDEI Conference: The Economics of Energy Markets, "Market-Clearing Electricity Prices and Energy Uplift," Toulouse, France, June 20, 2008.

Presenter, "Acting in Time: Regulating Wholesale Electricity Markets," Federal Energy Regulatory Commission Conference on Competition in Wholesale Power Markets, May 8, 2007.

Speaker, "Electricity Market Design: Coordination, Pricing and Incentives," ERCOT Energized Conference, Austin, TX, May 2008.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, May 2008.

Panelist, "Challenges for Long-Term Energy Models," Energy Information Administration Conference, Washington, DC, April 6-8, 2008.

Keynote Speaker, 15th Annual U.S.-Japan Symposium, "Stability and Sustainable Growth in the

Asia/Pacific Region,” Harvard Kennedy School, Cambridge, MA, March 18, 2008.

Panelist, “Reliability and Competition: The Price of Reliability?,” Independent Power Producers of Alberta 2008 Annual Conference, Banff, Alberta, Canada, March 10, 2008.

“Electricity Market Design: Coordination, Pricing and Incentives,” Faculty Research Seminar, Harvard Kennedy School, Cambridge, MA, March 5, 2008.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Boulder, CO, February 28-29, 2008.

“Electricity Market Design: Coordination, Pricing and Incentives,” Energy Policy Research Seminar, Harvard Kennedy School, Cambridge, MA, February 12, 2008.

Keynote Presenter, La Asociación Española para la Economía Energética (AEEE), Bilbao, Spain, January 2008.

Conference Co-Chair, Harvard Electricity Policy Group Plenary Session, Los Angeles, CA, December 2007.

Co-Chair, Kennedy School of Government, Harvard University, “Populism and Natural Resources” workshop, Cambridge, MA, November 2007.

Panelist, Harvard University, “Climate Engineering” workshop, Cambridge, MA, November 2007.

Speaker, Kennedy School of Government Alumni Refresher, Harvard University, “Electricity Market Design(s): Public Purposes and Policy Analysis,” Cambridge, MA, November 2007.

Speaker, Club de Madrid “Energy and Democracy” conference, “Democratizing Energy,” Madrid, Spain, November 2007.

Speaker, 27th USAEE/IAEE North American Conference, “Electricity Hybrids: Mixed Market Designs and Infrastructure Investments,” Houston, TX, September 2007.

Speaker, Edison Electric Institute, 2007 Transmission and Wholesale Markets School, Madison, WI, July 2007.

Speaker, Real Colegio Complutense en Harvard, “Energy Industry Restructuring,” Cambridge, MA, July 2007.

Speaker, 2007 Aspen Energy Policy Forum, “Electricity Markets – Where Are We Going?” July 2007.

Conference Co-Chair, Harvard Electricity Policy Group 47th Plenary Session, Cambridge, MA, June 2007.

Speaker, 14th Annual New England Energy Conference and Exposition, “Moving Into a Secure and Competitive Future,” Mystic, CT, May 2007.

Discussant, 15th Economia Panel Meeting, Yale University, New Haven, CT, May 2007.

Conference Co-Chair, Harvard Electricity Policy Group 46th Plenary Session, Laguna Beach, CA, March 2007.

Speaker, Institut D'Economie Industrielle, Toulouse, Conference on the Economics of Energy Markets,

Toulouse, France, January 2007.

Conference Co-Chair, Harvard Electricity Policy Group 45th Plenary Session, Dallas, TX, December 2006.

Speaker, University of Massachusetts INFORMS Seminar, Electricity Market Restructuring and Operations Research, Amherst, MA, October 2006.

Speaker, EUCI Conference on Transmission Reliability, Washington D.C., October 2006.

Conference Co-Chair, Harvard Electricity Policy Group 44th Plenary Session, Cambridge, MA, September 2006.

Conference Co-Chair, XVI Repsol YPF – Harvard Seminar on Energy Policy, Energy Markets, Security, Transparency, Barcelona, Spain, September 2006.

Keynote Speaker, 26th USAEE/ IAAE Annual North American Conference, Ann Arbor, MI, September 2006

Speaker: Edison Electric Institute, Transmission Market and Design Course, University of Wisconsin-Madison, Madison, WI, July 2006.

Keynote Speaker, Independent Power Producers Society of Alberta, Canada (IPPSA), Roundtable re Electricity Restructuring, Long-term Adequacy, Market Design, Calgary, Canada, June 2006.

Conference Co-Chair, Harvard Electricity Policy Group 43rd Plenary Session, Cambridge, MA, June 2006.

Speaker, Real Colegio Complutense - Harvard, Seminar on Government Restructuring: Privatization, Regulation and Competition, Cambridge MA, June 2006.

Speaker, Plenary Session, New England Conference of Public Utility Commissioners (NECPUC), Rockport, ME, June 2006.

Keynote Speaker, Infocast Conference on Open Access Transmission Tariff (OATT) Reform, Washington, D.C., June 2006.

Commentator, Conference on Venezuelan Economic Growth 1970-2005, Center for International Development, Harvard University, Cambridge MA, April 2006.

Speaker, University of California Energy Institute, POWER Conference, Berkeley, CA, March 2006.

Conference Co-Chair, Harvard Electricity Policy Group 42nd Plenary Session, La Jolla, CA, March 2006.

Speaker, Florence School of Regulation, Workshop on the Role and Status of Power Exchanges, European University Institute, Florence, Italy, January 2006.

Speaker, New York Independent System Operator, Workshop on Transmission Investments in Deregulated Markets, Albany, NY, December 2005.

Conference Co-Chair, Harvard Electricity Policy Group 41st Plenary Session, Atlanta, GA, December 2005.

Speaker, The Association of Power Exchanges [APEX] 2005 Annual Conference, Orlando, FL, November 2005.

Speaker, EUCI Conference on “Open Access: Are We There Yet?” Washington, D.C., October 2005.

Speaker, EUCI Conference on Transmission Investments and Reliability, Brewster, MA, September 2005.
Conference Co-Chair, Harvard Electricity Policy Group 40th Plenary Session, Cambridge, MA, September 2005.

Speaker, IAEE European Energy Conference, European Energy Markets in Transition, Bergen, Norway, August 2005.

Speaker, NARUC Electricity Committee Summer Conference, Austin, TX, July 2005.

Conference Co-Chair, Speaker, XV Repsol YPF - Harvard Seminar on Energy Policy, Making Energy Policy Work, Lisbon, Portugal, June 2005.

Speaker, IDEI Conference on the Economics of Electricity Markets, Toulouse, France, June 2005.

Conference Co-Chair, Harvard Electricity Policy Group 39th Plenary Session, Cambridge, MA, May 2005.

Speaker, McDermott, Will & Emery Energy Conference, Washington, D.C., April 2005.

Conference Co-Chair, Harvard Electricity Policy Group 38th Plenary Session, San Diego, CA, March 2005.

Speaker, American Antitrust Institute, Conference on Open Access Revisited: Lessons Learned, Arlington, VA, January 2005.

Speaker, Carnegie-Mellon University, Workshop on Electricity Transmission in Deregulated Markets, Pittsburgh, PA, December 2004.

Conference Co-Chair and Speaker, Harvard Electricity Policy Group Plenary Session, Austin TX, December 2004.

Conference Co-Chair, Harvard Electricity Policy Group 37th Plenary Session, Austin, TX, December 2004.

Speaker, IEEE/PSCE Power Systems Conference & Exposition, New York, NY, October 2004.

Conference Co-Chair, Harvard Electricity Policy Group 36th Plenary Session, Cambridge, MA, October 2004.

Speaker, IAEE European Conference on Modeling Energy Economics and Policy, Zurich, Switzerland, September 2004.

Speaker, EEI Market Design and Transmission Pricing School, Madison, WI, July 2004.

Conference Co-Chair, XIV Repsol YPF-Harvard Seminar on Energy Policy, Managing Energy Markets, A Coruña, Spain, June 2004.

Conference Co-Chair, Harvard Electricity Policy Group 35th Plenary Session, Cambridge, MA, May 2004.

Speaker, EUCI Conference on Preventing the Next Blackout, Washington D.C., April 2004.

Speaker, Panel Chair, U. Richmond Law School, Merhige Center of Environmental Law, Conference on The Blackout of 2003: What's Next? Richmond, VA, April 2004.

Conference Chair, Speaker, IEA Workshop on Transmission Network Reliability in Competitive Electricity Markets, Paris, France, March 2004.

Conference Co-Chair, Harvard Electricity Policy Group 34th Plenary Session, San Diego, CA, March 2004.

Speaker: CIDE-CRE Seminar: Energy Regulatory Developments in North America, Mexico City, Mexico, January, 2004.

Speaker, Infocast Transmission Executive Forum: Unlocking Transmission Investment, Washington D.C., January, 2004.

Speaker, IDEI Conference on Competition and Coordination in the Electricity Industry, Toulouse, France, January 2004.

Conference Co-Chair, Harvard Electricity Policy Group 33rd Plenary Session, Point Clear, AL, December 2003.

Session Chair, Conference on Wholesale Power Markets in New England, NECA, Boston, MA, November, 2003.

Speaker, New Directions in Regulation Seminar, Kennedy School of Government, Cambridge MA, October 2003.

Conference Co-Chair, Harvard Electricity Policy Group 32nd Plenary Session, Cambridge, MA, September 2003.

Speaker, EEI Market Design and Transmission Pricing School, Madison, WI, July 2003.

Session Chair, Aspen Institute Summer Energy Forum, Aspen, CO, July 2003.

Speaker, Standard and Poors 2003 Utility and Energy Conference, New York, NY, June 2003.

Speaker, ESAI Northeast Locational Energy Roundtable, Wakefield, MA, June 2003.

Speaker, 10th Annual Spring Energy Conference, NECA, Mystic, CT, June 2003.

Keynote Speaker, VII Latin American Energy Regulatory Entities Association (ARIAE) annual meeting, Oaxaca, Mexico, May 2003.

Conference Chair, XIII Repsol YPF-Harvard Seminar on Energy Policy, Salamanca, Spain, May 2003.

Conference Co-Chair, Harvard Electricity Policy Group 31st Plenary Session, Cambridge, MA, May 2003.

Speaker: 20th Annual Platts User Conference, Amelia Island, FL, April 2003.

Speaker, Conference on Deregulation in a Turbulent World, Maguire Energy Institute, Southern Methodist University, Dallas TX, April 2003.

Speaker, Conference on Electricity Deregulation: Where to From Here? Bush Presidential Conference Center, Texas A&M University, College Station, TX, April 2003.

Conference Co-Chair, Harvard Electricity Policy Group Special Session on Transmission, Cincinnati, OH,

April 2003.

Speaker, EIA 2003 National Energy Modeling System, Annual Energy Outlook Conference, Washington D.C., March 18, 2003.

Speaker, U.S. Department of State-sponsored videoconference from Australia, "Creating a Competitive Electricity and Gas Market." Cambridge, MA, USA and Canberra, Australia, February 2003.

Conference Co-Chair, Harvard Electricity Policy Group 30th Plenary Session, Palm Springs, CA, January 2003.

Speaker, Center for Energy and Environmental Policy Research, MIT, Workshop, Cambridge, MA, December 2002.

Session Co-Chair, Harvard Electricity Policy Group Special Session on Western Issues, Denver CO, December 2002.

Speaker, Nordic Energy Research Council, Conference on Electricity Market Reforms, Experiences and Lessons for the Future, Copenhagen, Denmark, November 2002.

Keynote Speaker, US Combined Heat and Power Association, 3d Annual Conference, Boston, MA, October 2002.

Panel Chair, ABA Section of Environment, Energy and Resources, Fall Meeting. Panel on FERC Rulemaking and Orders on RTO Development and Wholesale Electricity Market Structure," Portland, OR, October 2002.

Conference Co-Chair, Harvard Electricity Policy Group 29th Plenary Session, Cambridge, MA, September 2002.

Speaker, Harvard Business School Senior Executive Program/ E.ON Academy, Boston, MA, August 2002.

Speaker, Christensen Associates Conference on Connecting Wholesale and Retail Electricity Markets, Denver, CO, August 2002.

Speaker, EEI Market Design and Transmission Pricing School, Madison, WI, July 2002.

Speaker, 25th Annual IAEE International Conference, Aberdeen, Scotland, June 2002.

Conference Co-Chair, Harvard Electricity Policy Group 28th Plenary Session, Cambridge, MA, May 2002.

Speaker, Platts RDI User Conference, Amelia Island, Florida, April 2002.

Speaker, ABA Antitrust Section Spring Meeting, Washington, D.C., April 2002.

Conference Co-Chair, Harvard Electricity Policy Group Special Session, Atlanta, GA, April 2002.

Speaker, Carnegie-Mellon-Stanford Workshop on Energy Research Programs, Washington D.C. April 2002.

Keynote Speaker, USAEE /SAIS Washington Energy Policy Conference: New Developments in Electric Market Restructuring" Washington D.C., May 2002.

Speaker, Center for Research in Regulated Industries, Rutgers University, Advanced Workshop in Regulation and Competition, 21st Annual Eastern Conference, Newport, RI, May 2002.

Speaker, Harvard-Japan Project on Energy and the Environment, Tokyo Conference, Tokyo, Japan, January 2002.

Conference Co-Chair, Harvard Electricity Policy Group 27th Plenary Session, San Diego, CA, January 2002.

Keynote Speaker, ESAI Roundtable on Northeast Power Prices, Wakefield, MA, January 2002.

Keynote Speaker, Iberdrola Group Conference on Ten Years of Electricity Liberalization and Restructuring: Lessons Learned and Future Challenges, Madrid, Spain, December 2001.

Speaker, Commission de Regulation de l'Electricite, France, Conference on Market Design in Restructured Electricity Markets, Paris, France, November 2001.

Conference Co-Chair, Harvard Electricity Policy Group Special Session on Market Design, Cambridge, MA, September 2001.

Session Chair, National Association of Attorneys General, Energy Conference, Boston, MA, November 2001.

Speaker, Eighth Annual Kentucky Utility Conference, Lexington, KY, October 2001.

Conference Co-Chair, Harvard Electricity Policy Group, 26th Plenary Session, Washington, D.C., September 2001.

Speaker, Conference on Reform in the Mexican Electricity Industry, CIDE, Mexico City, September 2001.

Speaker, N.E. Environmental Protection Agency, Conference on "Keeping the Lights On and the Air Clean: Making the Energy-Environment Connection in New England," Cambridge, MA, July 2001.

Seminar Co-Chair, XII Repsol YPF - Harvard Seminar on Energy Policy, Energy Liberalization and Regulation: Revisiting Objectives and Results, Palma de Mallorca, Spain, July 2001.

Conference Co-Chair, Aspen Institute Program on Energy, the Environment, and the Economy, Forum on Energy Supplies and the Infrastructure, Aspen, CO, June 2001.

Conference Co-Chair, Harvard Electricity Policy Group 25th Plenary Session, Cambridge, MA, June 2001.

Speaker, Hale and Dorr Energy Group, Session on California and the Lessons for Massachusetts, Boston, MA, June 2001.

Speaker, Princeton University International Workshop on Privatization, Regulatory Reform, and Corporate Governance, Princeton, NJ, June 2001.

Speaker, EEI Transmission Policy Task Force Workshop, Milwaukee, WI, June 2001.

Speaker, 20th Annual Conference, Center for Research in Regulated Industries, Rutgers University, Tamiment, PA, May 2001.

Speaker, Conference on the Texas Electric Market and How It Compares to the California Market, University

of Texas at Austin, TX, May 2001.

Speaker, NY State Associated Press Conference, Syracuse, N.Y., April 2001.

Speaker, American Power Conference, Chicago, IL, April 2001.

Conference Co-Chair, Harvard Electricity Policy Group Special Session, Cambridge, MA, April 2001.

Speaker, National Energy Marketers Conference, Washington, D.C., April 2001.

Speaker, Utilicon Conference, Auckland, New Zealand, March 2001.

Speaker, AEI/ Brookings Joint Center Conference, "The California Electricity Market Meltdown: The End of Deregulation?" Washington, D.C., March 2001.

Conference Co-Chair, Harvard Electricity Policy Group 25th Plenary Session, San Diego, CA, February 2001.

Conference Co-Chair, Speaker, Harvard-Japan Project on Energy and the Environment, Tokyo, January 2001.

Conference Co-Chair, Speaker, XI Repsol YPF - Harvard Seminar on Energy Policy, Buenos Aires, Argentina, December 2000.

Conference Co-Chair, Harvard Electricity Policy Group Special Session on RTOs, Houston, TX, December 2000.

Speaker, Infocast Conference on Congestion and Parallel Path Issues, Washington, D.C., November 2000.

Speaker: Energy Bar Association MidYear Meeting, Washington D.C., November 17, 2000.

Speaker, Northeast Power Coordinating Council, General Meeting 2000 on Restructuring Reliably, Boston, MA, September 2000.

Conference Co-Chair, Harvard Electricity Policy Group 23rd Plenary Session, Boston, MA, September 2000.

Speaker, IAEE Conference "Towards an Integrated European Energy Market," Bergen, Norway, August 2000.

Speaker, Workshop for Markets for Electricity Economics and Technology (MEET), Palo Alto, CA, August 2000.

Conference Co-Chair, Aspen Institute Energy Forum on the Future Structure of the Energy Industry, Aspen, CO, July 2000.

Speaker, Conference on "Market Surveillance in Ontario's Wholesale Electricity Market," Toronto, Ontario, Canada, June 2000.

Speaker, Conference on "The New Energy in the New Millennium in Asturias," Oveido, Spain, June 2000.

Speaker, Northeast Energy and Commerce Association Annual Conference: "Emerging Energy Markets: the Future is Now," Boxborough, MA, May 2000.

Conference Co-Chair, Harvard Electricity Policy Group 22nd Plenary Session, Cambridge, MA, May 2000.

Discussant, Brookings Conference on Economic Activity in Latin America, New York University, New York, NY, May 2000.

Speaker, EEI/ Energy Daily Conference on Market Monitoring, Washington, D.C., May 2000.

Keynote Speaker, National Regulatory Agency on Electrical Energy (ANEEL), Brazil, International Teleconference on Strategic Development, Belo Horizonte, Brazil and Cambridge, MA, April 2000.

Speaker, IIT/ American Power Conference 2000, "What Is the Optimum Structure for the Midwest Grid?" Chicago, Illinois, April 2000.

Speaker, International Bar Association, Section on Energy and Natural Resources Law 2000, Hong Kong, April 2000.

Speaker, Infocast Conference on Maximizing the Value of Transmission Assets," Washington, D.C., April 2000.

Speaker, POWER Research Conference on Electricity Industry Restructuring, University of California, Berkeley, CA, March 2000.

Conference Co-Chair, Harvard Electricity Policy Group Special Session on Transition, Dallas, TX, March 2000.

Speaker, Christian A. Johnson Distinguished Lecture Series, "Making Markets for Power," Colby College, Waterville, ME, March 2000.

Speaker, Cantor Lecture Series 2000 on Energy and Society, Royal Society for the Encouragement of Arts, Manufactures & Commerce (RSA), London, UK, February 2000.

Speaker, Harvard-Japan Project on Energy and the Environment, Tokyo Conference, Tokyo, Japan, January 2000.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group 21st Plenary Session, St. Helena, CA, January 2000.

Conference Co-Chair, Speaker: Harvard Electricity Policy Group Special Session on the State of the Wholesale Market: Reliability and Regional Trade, Chantilly, VA, November 1999.

Speaker, EEI Transmission Policy Task Force Meeting, Denver, CO, November 1999.

Speaker, Conference on the Impacts of Congestion Pricing on Competitive Markets, Washington, D.C., November 1999.

Speaker, Northeast Interregional ISO Coordination Conference, Albany, NY, October 1999.

Speaker, ISO New England Board of Directors Meeting, Chatham, MA, October 1999.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group 20th Plenary Session, Newport, RI, September 1999.

Speaker, Utility Futures Group Seminar, Energy Foundation, Chicago, IL, September 1999.

Speaker, Session Chair, XX USAEE North American Conference, Orlando, FL, August 1999.

Speaker, XVII Latin American Meeting of the Econometric Society, Latin American Electricity Restructuring, Cancun, Mexico, August 1999.

Speaker, NARUC Summer Meeting, Electricity Committee Session, San Francisco, CA, July 1999.

Speaker, Executive Session on Infrastructure in a Market Economy, Kennedy School of Government, Harvard University, Cambridge, MA, July 1999.

Speaker, Executive Session on Environmental Economics and Policy Analysis, Harvard Institute for International Development, Harvard University, Cambridge, MA, July 1999.

Speaker, International Program on Privatization and Regulatory Reform, Harvard Institute for International Development, Harvard University, Cambridge, MA, July 1999.

Speaker, Workshop on the Introduction to Energy Economics and Policy, sponsored by the Department of Energy, Mexico, Mexico City, Mexico, June 1999.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group 19th Plenary Session, Cambridge, MA, May 1999.

Speaker, Session Chair, Hudson Institute International Forum on Regulatory Policy: Regulators and the Regulated -- Making the Regulatory Process Work, Washington, D.C., April 1999.

Speaker, Conference on Independent Transmission Companies: A Better Alternative to ISOs? Las Vegas, NV, April 1999.

Speaker, Infocast Conference on Congestion Management, Washington, D.C., March 1999.

Conference Co-Chair, Harvard Electricity Policy Group, Special Session on Retail and Wholesale Transmission Markets, Washington, D.C., March 1999.

Speaker, Massachusetts Electric Restructuring Roundtable, Boston, MA, March 1999.

Speaker, New England Conference of Public Utilities Commissioners, Conference on Congestion Management, Nashua, NH, March 1999.

Speaker, ITAM Conference on Electricity Restructuring, Mexico City, Mexico, February 1999.

Speaker, EEL/Energy Daily Conference on Grid Regionalization, Washington, D.C., February 1999.

Speaker: IEEE Power Engineering Society Winter Meeting, New York, NY, February 1999.

Conference Co-Chair, Session Chair, Harvard Electricity Policy Group 18th Plenary Session: Retail Competition in Theory and in Practice, Carmel, CA, January 1999.

Speaker, Harvard-Japan Project on Energy and the Environment, Annual Conference, Tokyo, January 1999.

Speaker, Edison Electric Institute Chief Executive Conference, Phoenix, AZ, January 1999.

Session Chair, Speaker: Federal Energy Bar Association Mid Year Meeting, Washington, D.C., December 1998.

Conference Co-Chair, Speaker: Harvard Electricity Policy Group Special Seminar on Regional Boundaries, Regional Markets and Regional Institutions, Milwaukee, WI, November 1998.

Speaker, ICM Conference on ISOs, Chicago, IL, November 1998.

Speaker, Massachusetts Electric Utility Restructuring Roundtable, Boston, MA, October 1998.

Speaker, GPU Rate Conference, Short Hills, NJ, October 1998.

Keynote Speaker, Conference on Pricing and Tariffs: How Transmission Pricing and Constraints Will Impact Competitive Markets, Washington, D.C., September 1998.

Conference Co-Chair, Harvard Electricity Policy Group 17th Plenary Session, Cambridge, MA, September 1998.

Speaker, FACS Conference on Covering Electricity Restructuring, Bedford, MA, September 1998.

Speaker, Workshop on Environmental Economics & Policy Analysis, Harvard Institute for International Development, Cambridge, MA, July 1998.

Speaker, International Program on Privatization and Regulatory Reform, Harvard Institute for International Development, Cambridge, MA, July 1998.

Session Chair, Aspen Institute Program on Energy, the Environment, and the Economy, Aspen, CO, July 1998.

Speaker, Seminar on Electricity Deregulation, Universita della Svizzera Italiana, Lugano, Switzerland, June 1998.

Conference Co-Chair, Session Chair, IX Repsol-Harvard Seminar on Energy Policy: "Geopolitics, Energy and the Future," Santiago de Compostela, Spain, June 1998.

Keynote Speaker, Conference on Transmission Pricing, Denver, CO, June 1998.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group 16th Plenary Session, on Looking to National Electric Restructuring Legislation, Cambridge, MA, May 1998.

Keynote Speaker, GE MAPS Users' Conference, Washington, D.C., May 1998.

Speaker, Province of Ontario, Market Design Committee, International Workshop on Electricity Restructuring, Toronto, Canada, May 1998.

Speaker, Conference on Antitrust and Anticompetitive Behavior: The New Rules of the Game for Electric Power, Washington, D.C., May 1998.

Conference Co-Chair, Harvard Electricity Policy Group and Managing the Atom Project: Workshop on Utility Restructuring and Nuclear Power, Boston, MA, April 1998.

Conference Co-Chair, Harvard Electricity Policy Group, Special Seminar on Independent System Operators, Portland, OR, April 1998.

Speaker, American Power Conference, 60th Annual Meeting, Technology: Focus for Competition and Globalization, Chicago, IL, April 1998.

Speaker, Progress and Freedom Foundation Conference on Creating Competitive Markets in Electricity: Progress in the States, Washington, D.C., March 1998.

Speaker, IEEE Power Engineering Society Winter Meeting, Tampa, FL, February 1998.

Speaker, LeBoeuf Lamb Greene & MacRae Seminar on the Introduction of Independent Power and the Restructuring of the Electricity Sector, San Francisco, CA, January 1998.

Conference Co-Chair, Harvard Electricity Policy Group, 15th Plenary Session, San Diego, CA, January 1998.

Speaker, Harvard-Japan Project on Energy and the Environment Tokyo Seminar, Tokyo, Japan, January 1998.

Speaker, NARUC-DOE Fifth National Electricity Forum, "Creating a New Industry," Washington, D.C., December, 1997.

Speaker, Conference on Antitrust and Anticompetitive Behavior, Washington, D.C., December 1997.

Speaker, Harvard-Ukrainian National Security Program, Harvard University, Cambridge, MA, December 1997.

Conference Co-Chair, Harvard Electricity Policy Group, Special Session on "Looking Ahead to the New Electricity Market: What Should Regulators Do?" Washington, D.C., November, 1997.

Speaker, USAEE North American Conference on International Energy Markets, Competition and Policy, San Francisco, CA, September 1997.

Conference Co-Chair, Harvard Electricity Policy Group 14th Plenary Session, San Diego, CA, September 1997.

Speaker, Energy Daily Annual Retail Competition Conference: Defining Yourself in the Retail Marketplace, Washington, D.C., September 1997.

Speaker, International Program on Privatization and Regulatory Reform, Harvard Institute for International Development, Cambridge, MA, July 1997.

Speaker, Workshop on Environmental Economics and Policy Analysis, Harvard Institute for International Development, Cambridge, MA, July 1997.

Conference Co-Chair, VIII Repsol-Harvard Seminar on International Energy Markets, Seville, Spain, June 1997.

Keynote Speaker, Midwest Governors' Conference Annual Meeting, Kansas City, KN, June 1997.

Speaker, Seminar on International Electricity Restructuring, University of Zurich, Switzerland, May 1997.

Speaker, New England Conference of Public Utility Commissioners, 50th Symposium, Newport, RI, May 1997.

Speaker, Meeting on Locational Marginal Pricing, Electric Clearing House, Houston, TX, May 1997.

Speaker, *The Electricity Journal* and National Economic Research Associates, Conference on Restructuring '97, Amelia Island, FL, April 1997.

Speaker, University of California Energy Institute, POWER Conference on Electricity Restructuring, Berkeley, CA, March 1997.

Speaker, Electric Power Research Institute, Workshop on Markets for Electricity: Economics and Technology, Stanford, CA, March 1997.

Conference Co-Chair, Harvard Electricity Policy Group, Seminar on Public Sector Strategies in a Restructured Electricity Industry, Nashville, TN, March 1997.

Speaker, Asia-Pacific Energy Forum, Sixth East Asia Electricity and Gas Forum, Tokyo, Japan, January 1997.

Speaker, Harvard-Japan Project on Energy and the Environment, Tokyo Conference, Tokyo, Japan, January 1997.

Conference Co-Chair, Harvard Electricity Policy Group, Plenary Session on ISO Governance, La Quinta, CA, January 1997.

Speaker, Massachusetts General Court Special Committee on Electric Utility Restructuring, Conference on Massachusetts Restructuring, Cambridge, MA, December 1997.

Speaker, Michigan State University Institute of Public Utilities, Conference on Surviving Regulatory Change and Competition, Williamsburg, VA, December 1997.

Speaker, Commonwealth of Virginia State Corporation Commission, Virginia Electricity Forum, Charlottesville, VA, November 1996.

Conference Co-Chair, Harvard Electricity Policy Group, Seminar on Regional Regulation, Cincinnati, OH, November 1996.

Keynote Speaker, Conference on Strategies for Structuring, Governing, and Operating Independent System Operators, Chicago, IL, October 1996.

Speaker, Southern Company College, Course on Emerging Competitive Energy Markets, Atlanta, GA, September 1996.

Conference Co-Chair, Harvard Electricity Policy Group, Plenary Session on Electricity Restructuring, Boston, MA, September 1996.

Speaker, Stockholm School of Economics, Conference on the Transition to a Deregulated and International Market for Electricity, Stockholm, Sweden, August 1996.

Speaker, National Association of Regulatory Utility Commissioners, Conference on ISOs and Regulation, Los Angeles, CA, July 1996.

Speaker, American Gas Association, Conference on Electric Industry Restructuring and FERC Order 888, Arlington, VA, July 1996.

Speaker, Aspen Institute Summer Energy Policy Forum, Aspen, CO, July 1996.

Speaker, Harvard Institute for International Development, Workshop on Environmental Economics and Policy Analysis, Cambridge, MA, June 1996.

Conference Co-Chair, Harvard Electricity Policy Group, Plenary Session on ISO Governance, Boston, MA, June 1996.

Speaker, Mid-America Regulatory Commissioners Conference, Assessing the Winds of Change, Chicago, IL, June 1996.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group, Plenary Session, Boston, MA, June 1996.

Speaker, Special Libraries Association, Annual Meeting, Boston, MA, June 1996.

Conference Co-Chair, Speaker, Repsol-Harvard Seminar on Energy Policy, Granada, Spain, May 1996.

Speaker, New England Conference of Public Utilities Commissioners, Annual Symposium, Manchester, VT, May 1996.

Speaker, Federal Energy Bar Association, Annual Meeting, Washington, D.C., May 1996.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group, Session on Residual Monopoly Services, Pittsburgh, PA, April 1996.

Speaker, U.S. Department of Justice/ Federal Trade Commission Workshop on Electricity Restructuring, Washington, D.C., April 1996.

Speaker, Centre for Global Energy Studies, Sixth Annual Conference, London, UK, April 1996.

Speaker, Electric Policy Research Institute, Conference on Innovative Approaches to Electricity Pricing, La Jolla, CA, March 1996.

Speaker, Harvard-Japan Project on Energy and the Environment, Tokyo Conference, Tokyo, Japan, January 1996.

Speaker, East Asian Electricity Restructuring Forum Conference, Bangkok, Thailand, December 1995.

Speaker, IEEE International Forum on Deregulation and Re-structuring in the Electric Power Sector, Belo Horizonte, Brazil, November 1995.

Speaker, Seminar on the Revolution in the Electric Power Industry, Carnegie Mellon University, Pittsburgh, PA, November, 1995.

Speaker, The New Hampshire General Court, The Retail Wheeling and Restructuring Study Committee, Concord, NH, November, 1995.

Speaker, Energy Policy Seminar, American Enterprise Institute, Washington, D.C., November, 1995.

Speaker, Indiana Energy Conference, Indianapolis, IN, November 1995.

Speaker: INFORMS National Meeting, New Orleans, LA, October 1995.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group Plenary Session, Chicago, IL, October 26-27, 1995.

Speaker, MIT Conference on Keeping the Lights On: Technical and Institutional Issues in a Restructured Electricity Industry, Cambridge, MA, October 1995.

Speaker, The Energy Council of Rhode Island, Annual Membership Meeting, Warwick, RI, October 1995.

Session Chair, Ninth Annual Northeast Electricity Policy Executive Session, Lenox, MA, October 1995.

Speaker, EPRI Conference on Achieving Success in Evolving Electricity Markets, Atlanta, GA, October 1995.

Speaker, North American Electric Reliability Council, Board of Trustees Meeting, Princeton, NJ, October 1995.

Speaker, National Conference of State Legislatures, Videoconference on Fuel for a Competitive Northeast, Washington, D.C., September 1995.

Speaker, Center for Business Intelligence, Conference on Valuing and Recovering Stranded Costs in the New Age of Competitive Power, Washington, D.C., September 1995.

Speaker, Jefferson Energy Foundation, Conference on Energy and Power: Succeeding in the New Competitive Era, Washington, D.C., September 1995.

Speaker, Institute for International Research, Conference on Transmission Access and Pricing: Responding to the FERC Mega NOPR, Washington, D.C., September 1995.

Speaker, Energy Generation Association, Summer 1995. Meeting, White Sulfur Springs, WV, July 1995.

Speaker, Aspen Institute on Energy, Environment, Economy, Conference on Electric Utility Industry Restructuring, Aspen, CO, July 1995.

Session Chair, International Association for Energy Economics, 18th International Conference, Washington, D.C., July 1995.

Speaker, Harvard Institute for International Development, Workshop on Energy Economics and Policy Analysis, Cambridge, MA, June 1995.

Conference Co-Chair, Speaker, Repsol-Harvard Seminar on International Energy Markets, S'Agaro, Spain, June 1995.

Speaker, University of Zurich, Institute for Economic Research, Seminar on Electricity Markets, Zurich, Switzerland, June 1995.

Speaker, East Asian Electricity Restructuring Forum, Beijing, China, May 1995.

Speaker, American Enterprise Institute, Energy Policy Forum, Washington, D.C., May 1995.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, May 1995.

Keynote Speaker, Public Utilities Research Center, University of Florida, Annual Conference on Market and Technological Convergence: Implications for Regulation, Gainesville, Florida, April 1995.

Speaker, Oak Ridge National Laboratories, Seminar on Electricity Transmission and Emerging Competition, Oak Ridge, Tennessee, April 1995.

Speaker, New Jersey Board of Public Utilities, Electric Power Industry Conference, Newark, N.J., March 1995.

Speaker, Electricity Consumers Resource Council, Workshop on Pools, Washington, D.C., February 1995.

Speaker, DOE National Energy Modeling Systems/ AEO Conference, Washington, D.C., February 1995.

Speaker, East Asian Electricity Restructuring Forum, Tokyo, January 1995.

Speaker, Harvard-Japan Conference on Energy and Environment, Tokyo, January 1995.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group Plenary Session, New Orleans, Louisiana, January 1995.

Speaker, New Jersey Board of Public Utilities, Conference on Electric Utility Restructuring, Newark, New Jersey, December 1994.

Speaker, Michigan State University, Institute of Public Utilities, 1994. Annual Conference, Williamsburg, VA, December 1994.

Speaker, New England Governors' Conference, Inc., Power Planning Committee, Meeting with New England Conference of Public Utilities Commissioners, Durham, NH, November 1994.

Speaker, University of Toronto, Faculty of Law, Seminar and Presentations, Toronto, Canada, November 1994.

Speaker, Federal Energy Bar Association, Mid Year Meeting on Turmoil for the Utilities, Washington, D.C., November 1994.

Speaker, U.S. Department of Energy/National Association of Regulatory Utility Commissioners, National Electricity Forum, Washington, D.C., November 1994.

Speaker, Association of Edison Illuminating Companies, Power Generation Committee, Meeting, Boston, MA, October 1994.

Speaker, Edison Electric Institute, Fall Legal Conference, New Orleans, Louisiana, October 1994.

Speaker, National Independent Energy Producers, Fall Conference, White Sulfur Springs, West Virginia, October 1994.

Speaker, Wisconsin Public Utility Institute, Conference on Public Policies toward Competition in the Electric Power Industry, Madison, Wisconsin, October, 1994.

Speaker, American Enterprise Institute, Energy Policy Forum, Washington, D.C., September 1994.

Speaker, Energy Daily Conference on The Impact of Retail Competition on the Electric Markets, San Diego, CA, September 1994.

Speaker, Southern Company Executive Forum, Atlanta, Georgia, September 1994.

Session Chair, Aspen Institute Workshop on the Electric Industry Moves Into Competitive Markets, Aspen, Colorado, July 1994.

Speaker, National Association of Regulatory Utility Commissioners Committee on Electricity, Summer

Meeting, San Diego, CA, July 1994.

Speaker, New York State Energy Research and Development Authority and Niagara Mohawk Conference on The Electric Industry in Transition, Albany, New York, June 1994.

Co-Chair, Speaker, Repsol-Harvard Conference on World Oil Markets, Barcelona, Spain, June 1994.

Speaker, TAPS Conference on Transmission, Washington, D.C., May 1994.

Speaker, Exnet Conference on Transmission Access and Pricing, Washington, D.C., April 1994.

Speaker, Joint Institute for Energy & Environment, University of Tennessee, Conference on Twenty Years After the Energy Shock: How Far Have We Come? Where Are We Headed? Knoxville, Tennessee, April 1994.

Speaker, Digital Equipment Corporation and Duke Engineering Conference on Utilities 2000, The Challenge of Change, Charlotte, North Carolina, March 1994.

Session Chair, National Independent Energy Producers Winter Meeting, Washington, D.C., January 1994.

Speaker, Harvard-Japan Project Conference on Energy and the Environment, Tokyo, Japan, January 1994.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group Plenary Session, San Diego, CA, January 1994.

Speaker, California Foundation on the Environment and the Economy, Executive Briefing on the British Electrical Energy System, San Francisco, CA, January 1994.

Speaker, Northeast Utilities Executive Planning Conference, Westbrook, Connecticut, November 1993.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, October 1993.

Session Chair, Harvard Northeast Utility Policy Executive Session, Southbury, Connecticut, October 1993.

Speaker, Canadian Association of Members of Public Utility Tribunals, Annual Conference, Ottawa, Canada, September 1993.

Speaker, Harvard University Fairbank Center Meeting, Economic Development in Southeast Asia, New York, September 1993.

Speaker, Session Chair, International Association for Energy Economics, Annual International Conference, Bali, Indonesia, July 1993.

Session Chair, Aspen Institute, Policy Issue Forum on Energy, Environment, and the Economy, Aspen, Colorado, July 1993.

Conference Co-Chair, Speaker, Harvard Electricity Policy Group Plenary Session, Cambridge, MA, July 1993.

Speaker, Center for Regulatory Studies, University of Illinois, Conference on Electric Transmission in the 1990s, Oak Brook, Illinois, May 1993.

Speaker, American Enterprise Institute, Energy Policy Forum, Washington, D.C., May 1993.

Speaker, Edison Electric Institute, Finance Committee Annual Meeting, New York, May 1993.

Participant, U.S. Office of Technology Assessment, Conference on Climate Treaties and Models, Washington, D.C., April 1993.

Speaker, Conference on Regional Transmission Groups: Creation, Regulation, Access, and Pricing, Washington, D.C., March 1993.

Speaker, American Bar Association Conference on Electricity Law and Regulation, Denver, Colorado, February 1993.

Speaker, Harvard-Japan Project Conference on Energy and the Environment, Tokyo, Japan, January 1993.

Speaker, Coopers & Lybrand Electric and Gas Industry Key Issues Forum, McLean, Virginia, December 1992.

Speaker, University of Rochester, W. Allen Wallis Institute of Political Economy, Inaugural Lecture Program, Rochester, New York, December 1992.

Speaker, Digital Equipment Corporation Conference on Achieving Business Excellence in Utilities, Atlanta, Georgia, November 1992.

Speaker, University of Toronto, Conference on The Post-Communist Transformation: Emerging Economic, Legal, and Business Implications, Toronto, October 1992.

Session Chair, Center for Business and Government, Harvard University, Northeast Electric Utility Policy Executive Session, Cooperstown, New York, October 1992.

Panel Member, Brookings Panel on Economic Activity, Brookings Institute, Washington, D.C., September 1992.

Speaker, Conference on Energy Cooperation in Central Asia and the Caucasus, Teheran, Iran, September 1992.

Speaker, Aspen Institute Forum on Environmental Policy and Governance: Economic Implications and Energy System Impacts, Aspen, Colorado, August 1992.

Speaker, Conference on Ukraine: The New Business Partner, Kiev, Ukraine, June 1992.

Speaker; Session Chair, IAEE Conference on Coping with the Energy Future: Markets and Regulations, Tours, France, May 1992.

Speaker, POWER Conference on Innovative Approaches to Energy and Environmental Planning in CA, Sacramento, CA, April 1992.

Speaker, International Bar Association, Section on Energy and Natural Resources Law Conference, Washington D.C., April 1992.

Session Chair Conference on Market-Based Mechanisms for Addressing Global Climate Change, Washington D.C., March 1992.

Speaker, National Independent Energy Producers Membership Meeting, Washington, D.C., January 1992.

Speaker, Harvard-Japan Conference on Energy and the Environment, Tokyo, Japan, January 1992.

Speaker, Symposium on Strategic Security of Ukraine, Kiev, Ukraine, December 1991.

Speaker, Royal Institute of International Affairs, Conference on Energy Policy: Market-Led or Government-Driven? London, December 1991.

Speaker, International Association of Energy Economics, North American Conference, Chicago, Illinois, November 1991.

Speaker, Edison Electric Institute, Strategic Planning Services Committee, Fall Conference, Washington D.C., November 1991.

Session Chair, Center for Business and Government, Harvard University, Northeast Electric Utility Policy Executive Session, Killington, Vermont, October 1991.

Speaker, Institute for East-West Security Studies Meeting on Economic Reform in Ukraine, New York, October 1991.

Speaker, Brookings Panel on Economic Activity, Symposium on the Soviet Economy after Communism, Brookings Institute, Washington, D.C., September 1991.

Speaker, American Bar Association, Section on Public Utility, Communications, and Transportation Law, Atlanta, Georgia, August 1991.

Speaker, Aspen Institute Forum on Oil, Energy Policy and National Security--After the Gulf Crisis, Aspen, Colorado, July 1991.

Speaker, Harvard-Repsol Conference on Oil Markets in the 1990s, Segovia, Spain, June 1991.

Conference Co-Chair, Project on Economic Reform in Ukraine, Conference on Military Conversion, Kiev, Ukrainian SSR, May 1991.

Speaker, Workshop on Social and Political Consequences of Decentralization and Privatization, Gdansk, Poland, April 1991.

Speaker, Harvard-Japan Project Conference on Energy and the Environment, Tokyo, Japan, January 1991.

Speaker, Conference on Infrastructure for the 1990.s, Harvard University, Cambridge, MA, November 1990.

Conference Co-Chair, Conference on Economic Reform in Ukraine, Harvard University, Cambridge, MA, November 1990.

Speaker, Workshop on Economic/Energy/Environmental Modeling for Climate Policy Analysis, MA Institute of Technology, Washington, D.C., November 1990.

Speaker, California Foundation on the Environment and the Economy, Conference on Electricity, Monterey, CA, May 1990.

Speaker, Independent Petroleum Association of America, Conference on Supply and Demand, Boston, MA, May 1990.

Speaker, Vinson & Elkins Seminar on Oil Markets, Houston, Texas, April 1990.

Speaker, American Gas Association Seminar on Gas Demand Modeling and Forecasting, Houston, Texas, February 1990.

Speaker, Harvard-Japan World Oil Market Study Seminar, Tokyo, Japan, January 1990.

Speaker, Harvard-Repsol Conference on International Energy, Toledo, Spain, November 1989.

Speaker, International Symposium on Petroleum Economics, Laval University, Quebec, September 1989.

Speaker, IAEE Conference on North American Natural Gas Supply and Markets, Denver, Colorado, September 1989.

Speaker, Harvard Utility Forum/ Harvard Gas Forum Seminar, Energy and Environmental Policy Center, Harvard University, Cambridge, MA, June 1989.

Speaker, California Public Utilities Commission, Workshop on Capacity Priority Allocation, San Francisco, CA, June 1989.

Conference Chair, Speaker, International Oil and Gas Conference, Energy and Environmental Policy Center, Harvard University, Cambridge, MA, June 1989.

Speaker, U.S. House of Representatives Energy Security Working Group meeting, Washington, D.C., May 1989.

Speaker, Federal Energy Regulatory Commission Hearings on Firm Natural Gas Transportation and Priority Capacity Allocation, Washington, D.C., March 1989.

Speaker, First Boston/Putnam, Hayes & Bartlett Utility CEO Forum, Key Largo, Florida, February 1989.

Speaker, Harvard Utility Forum/Harvard Gas Forum Seminars, Energy and Environmental Policy Center, Harvard University, Cambridge, MA, February 1989.

Speaker, American Bar Association, Electric Utilities Group, Conference on Electricity Pricing, San Francisco, CA, January 1989.

Speaker, Institut Francais du Petrole, Seminar on World Oil Markets, Paris, France, December 1988.

Speaker, Southwestern Legal Foundation, National Institute on Natural Gas Law, Dallas, TX, Nov. 1988.

Speaker, Putnam, Hayes and Bartlett Seminar on Law and Economics, Phoenix, Arizona, September 1988.

Speaker, Harvard-Japan World Oil Market Study Seminar, Tokyo, Japan, September 1988.

Session Chair, Gas Research Institute Energy Seminar, Hilton Head, South Carolina, August 1988.

Speaker, Oklahoma Independent Petroleum Association Conference, Tulsa, Oklahoma, July 1988.

Speaker, National Academy of Engineering Symposium on An Energy Agenda for the 1990s, Beckman Center, Irvine, CA, May 1988.

Speaker, Harvard-Repsol Seminar on International Energy, Toledo, Spain, April 1988.

Speaker, EEP/ Texas Oil and Gas Seminar, Dallas, Texas, March 1988.

Speaker: University of Houston Conference on Oil Tariff Policy, Houston, Texas, March 1988.

Speaker, Harvard Utility Forum/ Harvard Gas Forum Seminar, Palm Beach, Florida, February 1988.

Speaker, Southern Economic Association Conference, Session on the Future of OPEC, Washington, D.C., November 1987.

Speaker, Boston Gas Company Planning Conference, New Seabury, MA, October 1987.

Speaker, Ashland Exploration Company Conference on Oil Market Development, San Antonio, Texas, October 1987.

Speaker, Harvard-Japan Project on International Oil, Seminar, Tokyo, Japan, October 1987.

Session Chair, Harvard Executive Session on Northeast Electric Power Policy, Martha's Vineyard, MA, September 1987.

Speaker, American Jewish Congress Governing Council, Effects of an Oil Tariff, New York, New York, September 1987.

Speaker, Stockholm School of Economics Seminar on International Energy Demand, Stockholm, Sweden, August 1987.

Session Chair, International Association of Energy Economists North American Conference on The Growth of Risk, Calgary, Canada, July 1987.

Speaker, South Texas College of Law, Advanced Oil and Gas Course, Houston, Texas, June 1987.

Speaker, New York University Energy Forum on U.S. and World Oil Reserves, New York, New York, June 1987.

Speaker, Potomac Electric Power Company Conference on Future Fuel Prices, Washington D.C., May 1987.

Speaker, International Oil and Gas Conference on Energy Security Revisited, Energy and Environmental Policy Center, Harvard University, Cambridge, MA, May 1987.

Speaker, Harvard/Federal Energy Regulatory Commission Seminar on Natural Gas Regulation, Cambridge, MA, May 1987.

Speaker, Northwestern University Conference on Petroleum Economics and Management, Evanston, Illinois, April 1987.

Speaker, Harvard Japan Oil Market Study Workshop, Harvard University, Cambridge, MA, March 1987.

Speaker, Washington Energy Conference on U.S. Energy Security, Johns Hopkins University School of Advanced International Studies, Washington, D.C., March 1987.

Panelist: Conference on Venezuela/ Energy Issues, Harvard Institute for International Development,

Cambridge, MA, March 1987.

Speaker, Conference on Oil Tariff Policy, Washington D.C., December 1986.

Speaker, Session Chair, International Association of Energy Economists Eighth Annual North American Conference on the Changing World Energy Economy, Cambridge, MA, November 1986.

Speaker: Cabot Corporation Seminar on International Investments and Operations, Boston, MA, Oct. 1986.

Session Chair, World Energy Conference, 13th Congress, on Energy: Needs and Expectations, Cannes, France, October 1986.

Speaker, Session Chair, Harvard Executive Session on Northeast Electric Power, Martha's Vineyard, MA, September 1986.

Speaker, Aspen Institute Summer Forum on the Policy Implications of Declining Oil Prices, Aspen, Colorado, August 1986.

Speaker, The Johns Hopkins School of Advanced International Studies/ IAEE Workshop on The Oil Price Collapse: Impact on Demand, Washington, D.C., June 1986.

Speaker, Electric Power Research Institute Conference, Williamsburg, Virginia, May 1986.

Session Chair, Harvard International Oil Conference on Managing Oil Market Risk, Cambridge, MA, May 1986.

Speaker, RAND Conference on International Economic Surprises, Santa Monica, CA, December 1985.

Session Chair, EPRI/Harvard Workshop on Risk Management: Charting A Research Agenda for the Future, Cambridge, MA, October 1985.

Speaker, Executive Seminar at Stanford University: Energy Decisionmaking in the 80s, Stanford, CA, July 1985.

Speaker, Industrial Bank of Japan, Middle East Seminar, Tokyo, June 1985.

Speaker, International Association of Energy Economists Conference, Bonn, Federal Republic of Germany, June 1985.

Speaker, Interstate Natural Gas Association of America Conference, Colorado Springs, April 1985.

Speaker, Synfuels '85 Conference, sponsored by the National Council on Synthetic Fuels Production and Synthetic Fuels Research Institute, Hilton Head, South Carolina, April 1985.

Participant, Stanford University Trilateral Energy Policy Workshop, Stanford CA, February 1985.

Speaker, Brookhaven Conference on Energy Planning Under Uncertainty, Brookhaven, New York, August 1984.

Speaker, RFF Conference on Energy Security, Washington, D.C., June 1984.

Speaker, Nordic Council Meeting on Energy Planning Under Uncertainty, Kungälv, Sweden, June 1984.

Speaker, Energy Bar Association, Washington, D.C., January 1984.

Speaker, American Economics Association, December 1983.

Speaker, ORSA/TIMS Meeting, Chicago, Illinois, November 1983.

Speaker, National Defense University, Washington, D.C., 1983.

Speaker, Stanford University Executive Session on Energy Investments in the 1980s, Stanford, CA, 1982.

Speaker, ORSA/TIMS, Joint National Meeting, CA, 1982.

Speaker, Brookings Institute Seminar, Washington, D.C., 1982.

Speaker, Workshop on Energy Policy in the US and China, Peoples Republic of China, 1982.

Speaker, Energy and Security Workshop, Tokyo, Japan, 1982.

Speaker, Department of Energy Symposium on DOE's New Integrated Forecasting System, Washington, D.C., 1982.

Speaker, Harvard University, Kennedy School of Government, Conference on Energy and Security in the 1980s, Cambridge, MA, 1982.

Speaker, Harvard University, Kennedy School of Government Executive Session on Nuclear Power and Energy Availability, Cambridge, MA, 1982.

Member, Synthetic Fuels Study Panel, Synthetic Fuels Corporation, 1982.

Speaker, Institute of Gas Technology, Conference on Energy Modeling, 1982.

Speaker, IAEE Panel on Synthetic Fuels Policy, Houston, Texas, 1982.

Speaker, European American Institute, 1981.

Speaker, Security Conference on Asia and the Pacific, 1981.

Speaker, Volvo Conference on European Energy Needs, 1981.

Speaker, Stanford Conference on Energy Productivity, Stanford, CA, 1981.

Speaker, Symposium on Modeling of Large-scale Systems, IIASA, Laxenburg, Austria, 1980.

Speaker, University of Southern CA, Center for the Study of the American Experience, Annenberg School of Communications, Conference on America in an Era of Plentiful But Higher-Priced Energy, 1979.

Speaker, TIMS/ORSA Meeting, New Orleans, Louisiana, 1979.

Discussant, Resources for the Future/NSF Conference on the Implications of Potential Resource and Environmental Constraints for Growth, San Francisco, CA, 1979.

Session Chair, The Institute of Management Sciences XXIV International Meeting, Honolulu, Hawaii, 1979.

Speaker, Alliance to Save Energy, Symposium, Dumbarton Oaks, Virginia, 1979.

Program Co-Chair, IAEE/RFF Conference on International Energy Issues, Washington D.C., 1979.

Speaker, Aspen Institute Conference on Governmental Issues Concerned with the Siting of Nuclear Waste, Aspen, Colorado, 1979.

Speaker, Triennial Meeting of the International Federation of Operations Research Societies, Toronto, Canada, 1978.

Speaker, Bay Area Chapter, International Association of Energy Economists, San Francisco, CA, 1978.

Speaker, 5th Annual Energy Technology Conference, Washington, D.C., 1978.

Speaker, IEEE Conference, New Orleans, 1977.

Speaker, American Economics Association Conference, New York, 1977.

Speaker, Annual Meeting of National Association of Business Economists, 1977.

Participant, Program Committee, Lawrence Symposium on Systems and Decision Sciences, 1977.

Speaker, TIMS Conference on Energy and the Economy, San Francisco, 1977.

Speaker, American Mathematical Society Short Course on Energy, 1976.

Participant, Washington Operations Research Council, 1976.

Participant, National Petroleum Refiners Association, 1975.

Participant, TIMS New York Regional Chapter, 1975.

Speaker, Energy Analysis Meeting of International Federation of Institutes of Advanced Study, 1975.

Participant, Friends of Optimization, 1975.

Participant, ORSA/TIMS Conference, Panel on Energy Use, New York, 1975.

Session Chair, ORSA/TIMS Conference, Panel on Large Energy Models, Las Vegas Nevada, 1975.