

Invitation for Comment on Candidates for the Economy-Wide Modeling Panel

July 7, 2014

The EPA Science Advisory Board (SAB) Staff Office announced in a *Federal Register* Notice on April 30, 2014 (79 FR 24425-24427) that it was forming a panel to provide independent advice to EPA through the chartered SAB on its materials on economy-wide modeling

To form the panel, the SAB Staff Office sought public nominations of nationally recognized experts in the follow areas:

- cost-benefit analysis;
- computable general equilibrium (CGE) modeling with experience in representing environmental and/or energy policy; the use of detailed sector models and linking CGE models to detailed sector models;
- non-CGE (macro) models for capturing general equilibrium effects of environmental policy;
- transition dynamics in a general equilibrium framework (e.g., in labor or capital markets; spatial sorting models);
- representation of health improvements and other types of benefits in a CGE or non-CGE framework (e.g. use of state-dependent utility functions);
- quantifying and monetizing spatially differentiated mortality/morbidity/non-health welfare, and non-use effects of air quality; the representation of non-use or environmental preferences in the utility function;
- labor economists with a macroeconomic or general equilibrium perspective who have expertise in the short-and long-run implications of regulatory decisions for household labor market decisions (e.g., labor-leisure trade-offs); labor market implications of productivity improvements due to better health; and
- risk and uncertainty to formally characterize uncertainty in CGE and non-CGE models including representation of the effects of uncertainty on behavior of economic agents.

Background information on the project and details on the nomination process appeared in the cited notice.

Based on qualifications and interest, the SAB Staff Office identified the attached “List of Candidates.” Brief biographical sketches of the fifty-one (51) candidates are listed below and will be posted on the SAB website for comment.

The SAB Staff Office Director makes the final decision about who will serve on the panel based on all relevant information. This includes a review of the candidate’s confidential financial disclosure form (EPA Form 3110-48) and an evaluation of a lack of impartiality. For the EPA SAB Staff Office, a balanced committee or panel is characterized by inclusion of candidates who possess the necessary domains of knowledge, the relevant scientific perspectives (which, among other factors, can be influenced by work history and affiliation), and the collective breadth of experience to adequately address the general charge. Specific criteria to be

used in evaluating a candidate include: (a) scientific and/or technical expertise, knowledge, and experience (primary factors); (b) availability and willingness to serve; (c) absence of financial conflicts of interest; (d) absence of an appearance of a lack of impartiality; (e) skills working in committees, subcommittees and advisory panels; and (f) diversity of, and balance among scientific expertise and viewpoints for the panel as a whole.

We welcome information, analysis or documentation for the Staff Office to consider in evaluating the candidates. Please provide any comments you may have with respect to the candidates no later than August 7, 2014. Please submit your comments to the attention of Dr. Holly Stallworth, Designated Federal Officer at stallworth.holly@epa.gov. Please be advised that comments are subject to release under the Freedom of Information Act.

Biosketch Information Economy-Wide Modeling Nominees

Balistreri, Edward

Colorado School of Mines

Dr. Edward J. Balistreri is an Associate Professor at the Colorado School of Mines, Division of Economics and Business. He holds a Ph.D. in economics from the University of Colorado -- Boulder. His research focuses on the formulation of numeric simulation models of economic policy. Dr. Balistreri's models have been used to analyze a diverse set of policy topics including global climate, energy, and international trade. He has also contributed to the literature on structural estimation and the empirical calibration of advanced models of industrial organization and trade. Prior to his entry into academics, Dr. Balistreri worked as an economist for the United States International Trade Commission and Charles River Associates.

Belzer, Richard

Independent consultant

Since 2001, Dr. Richard Belzer has been an independent consultant in regulation, risk, economics and information quality. Previously he was a visiting professor of public policy at Washington University in St. Louis and staff economist in the Office of Information and Regulatory Affairs in the Office of Management and Budget. He received his Ph.D. in public policy from Harvard University (1989), Master's in Public Policy (MPP) from the John F. Kennedy School of Government (now Harvard Kennedy School) (1982), and MS and BS degrees in agricultural economics from the University of California at Davis (1979, 1980). Current original research areas include the evaluation of agency compliance with applicable information quality guidelines; the use of objective economics indicators to identify adverse human health effects; the analysis of carcinogen classification schemes; the objective incorporation of human health risk assessments into benefit-cost analysis; the analysis of environmental justice ranking schemes; the analysis of patent law and examination practices; and the economics of certain innovations in U.S. wine markets. Recent consulting projects have included the evaluation of environmental claims made for certain consumer products for compliance with Federal Trade Commission guidelines; a benefit-cost analysis of California's drinking water standard for hexavalent chromium; and the critique of predicted human health impacts and monetized risks attributable to air emissions from new facilities designed to achieve federal regulatory standards. Dr. Belzer is a regular contributor to scholarly professions through journal peer review and service to professional societies. He was elected Treasurer of the Society for Risk Analysis (1998, 2000) and elected Secretary-Treasurer of the Society for Benefit-Cost Analysis (2008, 2010). He earned multiple awards for exemplary performance at OMB, given the SRA's Distinguished Service Award (2003), and named a Fellow of the Cecil and Ida Green Center for the Study of Science and Society (1995).

Berck, Peter

University of California

Dr. Peter Berck is the S.J. Hall Professor of Forest Economics and Professor of Agricultural and Resource Economics at the University of California, Berkeley. He graduated from UC Berkeley with a degree in mathematics in 1971 and took his Ph. D. at the Massachusetts Institute of Technology in 1976 in economics. He is a fellow of the American Agricultural Economics Association and holds an honorary doctorate from Umea University in Sweden. He has over 100 research publications on the economics of the environment, agriculture, forestry and economy wide impact. Dr. Berck is the author of the Dynamic Revenue Analysis Model and the Environmental Dynamic Revenue Analysis Model, which are used by the California Air Resources Board (CARB) and the California Department of Finance to analyze the economy wide effects of environmental regulation in California. Professor Berck also used the model to analyze the economy wide costs of the electric crisis and various proposed tax changes. Results have been presented to the CARB, Department of Finance and in Federal Court and in case before the Federal Energy Regulatory Commission.

Böhringer, Christoph

University of Oldenburg

Dr. Christoph Böhringer is Professor for Economic Policy at the Carl von Ossietzky University in Oldenburg. After his graduation as industrial engineer from the Technical University of Karlsruhe, he received a doctorate in economics at the University of Stuttgart in 1995, where he became head of the Energy Economics section at the Institute for Energy Economics and the Rational Use of Energy (IER). From 1999 to 2006, he led the Environmental and Resource Economics Department at the Centre for European Economic Research (ZEW) in Mannheim. In 2002, he habilitated in Economics at the University of Regensburg and in 2004 he became full Professor of Economics at the University of Heidelberg. In early 2007, he moved from Mannheim respectively Heidelberg to Oldenburg, where he now holds the chair of Economic Policy. His research activities focus on the economic impact assessment of regulation, especially in the field of environmental, energy and climate policy. His scientific findings have been published in many internationally renowned journals. Dr. Böhringer is research professor at the Centre for European Economic Research (ZEW) and a member of the Commission of Experts for Research and Innovation that was established by the German government.

Bui, Linda

Brandeis University

Dr. Linda Bui received her Ph.D in economics from the Massachusetts Institute of Technology (MIT) in 1993 and is currently an Associate Professor of Economics at Brandeis University. She has taught at Boston University, the University of Michigan, MIT, and the Sloan School of Management. Professor Bui has done work in the area of environmental regulation and its effects on firm-level behavior, strategic environmental behavior between autonomous countries in the context of trans-boundary pollution, and the effectiveness of public disclosure as a regulatory instrument for the environment. Dr. Bui's current research focuses on health outcomes and the environment. She currently has funding through Brandeis University's Theodore and Jane Norman grant to study the relationship between poverty, health, and the environment.

Carbone, Jared

University of Calgary

Dr. Jared Carbone is an Associate Professor at the University of Calgary in the Department of Economics. He currently serves as co-editor of the *Journal of Environmental Economics and Management* and as a member of the editorial council for the *Journal of the Association of Environmental and Resource Economists*. Dr. Carbone's research focuses primarily on evaluating the economy-wide impacts of environmental regulations and the use of applied general equilibrium models to address these problems. He has written about international trade and regulatory responses to global warming, about environmental taxation and fiscal reform, and about how to model the demand for environmental quality and health in economy-wide benefit-cost assessments. Dr. Carbone completed a Ph.D. in Economics at the University of Colorado at Boulder in 2003 where he worked under the mentorship of Thomas F. Rutherford. Subsequently, he worked with V. Kerry Smith as a post-doctoral fellow at the Center for Environmental and Resource Economics Policy at North Carolina State University from 2003 to 2005.

Coffey, Bentley

University of South Carolina

Dr. Bentley Coffey is currently a visiting Assistant Professor at the Economics Department of the Darla Moore School of Business at the University of South Carolina. Dr. Coffey received a BA in international studies double-majored with economic theory and a BS in computer science with a minor in math from American University. While at American University, Dr. Coffey was also awarded an MS in environmental science. Duke University awarded Dr. Coffey a PhD in economics with major fields in econometrics and public economics, including a special emphasis on environmental economics. Dr. Coffey's research interests span most of environmental economics but also reach into other areas of

applied microeconometrics, particularly labor economics where he has published in the *Journal of Labor Economics*, *Public Choice*, and *American Law and Economic Review*. Within environmental economics, Dr. Coffey has worked on several projects that explored uncertainty in the estimated costs and/or benefits of reducing air pollution in a general equilibrium context (both for Tiebout sorting within a local economy and computable general equilibrium modeling of the entire macroeconomy with extensive detail of the energy sector). He is currently working on a project that estimates the cumulative cost of interacting regulations on a multi-sector general equilibrium model of the macroeconomy; his current work also include several projects that attempt to gauge the implications for climate change adaptation, within a computable general equilibrium modeling framework, of novel estimates for electricity demand and power generation by hydroelectric dams. Dr. Coffey's research projects have benefited from funding awarded by the Mercatus Center and Resources for the Future. Prior to the University of South Carolina, Dr. Coffey served as an assistant professor in the John E Walker Department of Economics at Clemson University; he has also worked as a senior economist at The Cadmus Group, an environmental consulting firm, where Dr. Coffey supported EPA in conducting risk and cost-benefit analyses of drinking water contaminant regulations.

de la Chesnaye, Francisco

Electric Power Research Institute

Dr. Francisco de la Chesnaye is a Program Manager in the Electric Power Research Institute (EPRI) Energy and Environmental Analysis Group with responsibilities over the Global Climate Policy Costs and Benefits Program and related macroeconomic analyses. The focus of his research is on conducting energy-economic analyses to assess the impact of technology development and energy policies on the electric power sector, the energy system, and the economy at both national and international scales. In addition to his work at EPRI, Dr. de la Chesnaye has served on various external expert panels. He was a Lead Author on the 2014 U.S. Climate Assessment's Mitigation chapter. Dr. de la Chesnaye was a lead author in a recently completed National Academies of Sciences report to Congress that evaluated the "Effects of Provisions in the Internal Revenue Code on U.S. Greenhouse Gas Emissions." In 2010, Dr. de la Chesnaye served on an Academies Panel which completed a report to Congress titled "Limiting the Magnitude of Future Climate Change." Prior to joining EPRI in 2008, Dr. de la Chesnaye was the Chief Climate Economist at the U.S. Environmental Protection Agency where he was responsible for developing and applying EPA's economic models for domestic and international climate change policy analysis. Dr. de la Chesnaye also was a Lead Author for the Intergovernmental Panel on Climate Change's Fourth Assessment Report and was a co-editor of *Human-Induced Climate Change: An Interdisciplinary Assessment* published by Cambridge Univ. Press (2007). Dr. de la Chesnaye has a Ph.D. in Public Policy from the Univ. of Maryland. He also holds graduate degrees from Johns Hopkins and American University and a BS from Norwich Univ., The Military College of Vermont.

Dean, William

California Environmental Protection Agency

Dr. William E. Dean is a Climate Change Advisor at the California Environmental Protection Agency (Cal/EPA). Previously he worked in the Economic Studies Section of the California Air Resources Board (CARB). Since 2005 Dr. Dean has modeled the economic impact of California's ambitious greenhouse gas reduction plans. His work provided analytical support for the 2005 Governor's executive order establishing greenhouse gas emission targets and also for the California Global Warming Solutions Act of 2006. While at CARB, Dr. Dean used E-DRAM, a computable general equilibrium model of the California economy. He added some features to E-DRAM, including the incorporation of a carbon price in the equations. In addition, Dr. Dean used E-DRAM to calculate the economic impact of major criteria air pollutant regulations. He also worked on other projects, such as: he scrutinized the basis for U.S. EPA and ARB methodology for calculating monetary estimates of the benefits of avoiding premature death; he performed benefit-cost analysis for diesel particulate matter. While at Cal/EPA, Dr. Dean played a major role on the Economic Modeling Team of the Western Climate Initiative. He took model runs of ENERGY 2020 from the contractor, ICF, and imposed the emissions cap during the post-processing, thus calculating the emissions, the allowance price, quantity and timing of banking and offsets, and year-by-year costs. For several years Dr. Dean advocated that state agencies ought to get

together and obtain a subscription to REMI to improve their capability for performing economy-wide modeling. Last year Dr. Dean helped organize a workshop to introduce California's Department of Finance and state agency economists to Regional Economic Model, Inc. (REMI) now that many state agencies are using REMI models in support of their Standardized Regulatory Impact Assessments of major regulations. Dr. Dean received a Ph.D. in public policy analysis from the RAND Graduate School, a Master's degree in physics from the University of Texas at Austin, and bachelor degrees in physics and mathematics at Kansas University. Dr. Dean is an active member of the Air & Waste Management Association, the American Association for the Advancement of Science, and an officer of the Sacramento Economics Roundtable, which is a chapter of the National Association for Business Economics.

Dellink, Rob

Organization of Economic Cooperation and Development

Dr. Rob Dellink is currently the Co-ordinator Modelling and Outlooks in the Organization for Economic Cooperation and Development (OECD) Environment Directorate. He oversees the Directorate's work on the economic modelling analysis of environmental policies, including the quantitative projections of possible future developments of a number of economic and environmental trends, as described in the OECD Environmental Outlook series. The modelling work is largely based on global dynamic computable general equilibrium (CGE) analysis, and focuses among others on the economic consequences of climate change and air pollution policies, and the feedbacks of policy inaction on economic growth. Dr. Dellink joined the OECD in 2009, working in the modelling team of the Environment Directorate, before taking over as co-ordinator of the team in 2010. Prior to joining the OECD, Dr Dellink worked as a senior research economist at the VU University in Amsterdam and as Assistant Professor in environmental economics at Wageningen University, both in the Netherlands. He holds a PhD in economics from VU University Amsterdam.

Dixon, Peter

Victoria University

Dr. Peter Dixon is a Professor in the Centre of Policy Studies, Victoria University, Melbourne. He received his Ph.D. from Harvard in 1972. His research focuses on the creation and application of computable general equilibrium (CGE) models. Together with colleagues at the Centre of Policy Studies, he created the ORANI model and its dynamic successor, MONASH. These models have been prominent in the Australian economic debate for 35 years and have been used as templates for the development of other models throughout the world. He is the principal author of the ORANI and MONASH books published in the North Holland Contributions series in 1982 and 2002. In recent years he has led the development of the USAGE model of the U.S. which is being used by the U. S. International Trade Commission and the Departments of Agriculture, Commerce, Energy, Transportation and Homeland Security to study issues in trade, environment, energy, immigration, transportation, security and macroeconomic stimulation. In 2013 he edited (with Dale Jorgenson) Elsevier's two-volume Handbook of Computable General Equilibrium Modeling. Dr. Dixon's contributions have been recognized through professional and national honours. In 2003, he was awarded the Distinguished Fellowship of the Economic Society of Australia. In 2014 he was appointed Officer in the Order of Australia for "distinguished service to education in the field of applied economics as an academic, researcher and author, through significant contributions to policy analysis and modelling."

Fisher-Vanden, Karen

Pennsylvania State University

Dr. Karen Fisher-Vanden is Professor of Environmental and Resource Economics at Pennsylvania State University. Professor Fisher-Vanden holds a B.S in Mathematics and a B.A in Economics both from University of California—Davis, a M.S. in Management Science from the Anderson Graduate School of Management at University of California—Los Angeles, and a Ph.D. in Public Policy from Harvard University. She has held previous positions as Assistant and Associate Professor of Environmental Studies at Dartmouth College, as Senior Research Scientist at Battelle, Pacific Northwest National Laboratories in Washington, D.C. and as an Air Quality Specialist at the South Coast Air Quality Management District (SCAQMD) in Los Angeles. Dr. Fisher-Vanden was a Lead Author of the Intergovernmental Panel

on Climate Change (IPCC) Fifth Assessment Report Working Group III, and a previous member of the U.S. Climate Change Science Program (CCSP) Product Development Advisory Committee and lead author of a congressionally-mandated CCSP report on global change scenarios. Her areas of research include economic and integrated assessment modeling for climate change policy analysis; economic instruments for pollution control; and technology development in developing countries (in particular, China) and implications for energy use and carbon emissions. She is currently involved in a number of externally-funded research projects including: (1) Research in Integrated Assessment, Inter-Model Development, Testing and Diagnostics (joint with Stanford University) funded by the Department of Energy; and (2) Sustainable Climate Risk Management (SCRiM) strategies, a Sustainable Research Network (SRN) project funded by National Science Foundation.

Foss, Michelle

University of Texas at Austin

Dr. Michelle Michot Foss is chief energy economist and program manager at the Bureau of Economic Geology's Center for Energy Economics, University of Texas (UT), Jackson School of Geosciences. She has more than 35 years of experience; advises U.S. and international energy companies; publishes and speaks widely; provides public commentary and testimony. Her expertise includes global oil and gas, liquified natural gas (LNG), gas-power, energy/economics scenarios and outlooks. She has developed and led U.S. and foreign projects including corporate funded research and consortia (U.S.-Mexico gas, North America gas-power, global gas and power, North American LNG), USAID/U.S. Department of State (Central Asia, South Asia, West Africa), U.S. Department of Energy (oil markets, U.S.-China Oil and Gas Industry Forum, Iraq oil and gas), World Bank (NOCs) and research and training contracts by sponsoring organizations in Japan, Mexico, Trinidad and Tobago, Angola. She was co-principal investigator on a review and update of natural gas emissions factors for U.S. Environmental Protection Agency led by Dr. David Allen, UT Melvin H. Gertz Regents Chair in Chemical Engineering. Previous research and consulting in environment and natural resources included summer research at Gulf Coast Marine Lab; field studies for a Texas coastal power project; publications support for a Texas A&M oil spill program then under direction of Dr. Jerry Neff; field studies and permitting for coal and non-fuel mining operations in the Rocky Mountain region. Dr. Michot Foss is also an executive instructor, UT McCombs School of Business corporate energy programs; she co-developed the UT-ExxonMobil global upstream commercial overview program and is a recipient of an ExxonMobil Teaching Excellence award 2013. She received a Author Achievement Award 2013. She is a Senior Fellow, U.S. Association for Energy Economics (USAEE, 2006); was International Association for Energy Economics president (2003) and USAEE president (2001); was chosen one of the Key Women in Energy-Americas (2003); named to the Scientific Council, 50th Anniversary of ENI Commemorative Encyclopedia of Hydrocarbons (2003); is a member of the U.S. Chamber of Commerce-Energy Institute board and Oil & Gas Journal economic advisory board; served on the LNG 17 Houston 2013 program committee and U.S.A.-International Gas Union triennium committee; and is a member of the Council on Foreign Relations, Society of Petroleum Engineers, and Association of International Petroleum Negotiators. She holds degrees from University of Louisiana-Lafayette (biology/geology minor), Colorado School of Mines (MS economics), and University of Houston (PhD political science).

Fox, Alan

International Trade Commission

Dr. Alan K. Fox is an international economist in the Research Division, Office of Economics, of the U.S. International Trade Commission (USITC), where he leads the Division's Trade and Environment research program. Dr. Fox joined the USITC in 2000 after completing his graduate studies at the University of Michigan, Ann Arbor. Dr. Fox specializes in modeling the effects of trade and environmental policy. His research interests include the study of emissions abatement policies and trade, trade policy reform, and the logistics of border crossing and trade. He has co-authored a number of articles on the effectiveness of output-based rebating and other emissions abatement mechanisms in mitigating carbon leakage under partial regulation. His other research on trade policy investigates the macroeconomic and trade effects of logistics barriers and rules of origin. He has also co-authored work investigating when foreign

firms choose to cooperate in antidumping investigations, the role of Armington elasticities in fitting trade models, and the potential of a “peace dividend” at the end of the Cold War. In his role as economic modeler at the USITC, Dr. Fox has analyzed the economic effects of most free trade agreements signed by the United States since 2000. In 2009, he conducted the modeling for the interagency report, “The Effects of H.R. 2454 on International Competitiveness and Emission Leakage in Energy-Intensive Trade-Exposed Industries: an Interagency Report Responding to a Request from Senators Bayh, Specter, Stabenow, McCaskill, and Brown.” He has also participated as chief modeler, project leader, or deputy project leader on the past six updates of the USITC investigation Economic Effects of Significant U.S. Import Restraints.

Fullerton, Don

University of Illinois

Dr. Don Fullerton joined the University of Illinois at Urbana-Champaign in 2008 as Gutgsell Professor in the Department of Finance, the Institute for Government and Public Affairs (IGPA), and the Center for Business and Public Policy (CBPP). He graduated from Cornell in 1974 and received a PhD in Economics from U.C. Berkeley in 1978. He won the Outstanding Doctoral Dissertation Award of the National Tax Association, and went on to teach at Princeton University (1978-84), the University of Virginia (1984-91), Carnegie Mellon University (1991-94) and the University of Texas (1994-2008). From 1985 to 1987, Don served in the U.S. Treasury Department as Deputy Assistant Secretary for Tax Analysis, where he received the Meritorious Service Award for his work on the Tax Reform Act of 1986. From 1995 to 2000, he was Director of the American Economic Association (AEA) Summer Minority Program. Currently, he is a member of the AEA Committee on the Status of Minority Groups in the Economics Profession. Fullerton is Managing Editor of The B.E. Journal of Economic Analysis and Policy, and he is the Program Director for the Environmental and Energy Economics Program of the National Bureau of Economic Research (NBER). The author of over a hundred published papers and books, Dr. Fullerton is editor of *The Distributional Effects of Environmental and Energy Policy* (Aldershot, UK: Ashgate Publishers, 2009).

Gayer, Ted

Brookings Institution

Dr. Ted Gayer is the Vice President and Director of the Economic Studies program and the Joseph A. Pechman Senior Fellow at the Brookings Institution. He conducts research on a variety of economic issues, focusing particularly on public finance, environmental and energy economics, housing, and regulatory policy. Prior to joining the Brookings Institution in September 2009, he was associate professor of public policy at Georgetown University. From 2007 to 2008, he was deputy assistant secretary for Economic Policy at the Department of the Treasury. While at Treasury, he worked primarily on housing and credit market policies, as well as on energy and environmental issues, health care, Social Security and Medicare. From 2003 to 2004, he was a senior economist at the President’s Council of Economic Advisers, where he worked on environmental and energy policies. From 2006 to 2007, he was a visiting fellow at the Public Policy Institute of California, and from 2004 to 2006 he was a visiting scholar at the American Enterprise Institute.

Hafstead, Marc

Resources for the Future

Dr. Marc Hafstead is a Fellow at Resources for the Future. His research spans environmental economics and macroeconomics, with an emphasis on developing detailed dynamic general equilibrium models. Within environmental economics, he models the effects of alternative environmental policies such as carbon taxes, cap-and-trade programs, and clean energy standards in economies with multiple non-environmental frictions and distortions on key outcomes such as emissions reductions, welfare, and employment. He is the co-author of the Goulder-Hafstead Energy-Environment-Economy (E3) model. The model is computable general equilibrium (CGE) model with 24 domestic industries and international trade. The model combines a detailed treatment of the U.S. tax system and a detailed representation of energy production and demand. The model has been featured in one peer-reviewed publication and

two RFF working papers. Dr. Hafstead is also currently working on a new general equilibrium model to explore the impacts of environmental regulation on unemployment in both regulated and unregulated sectors, with Dr. Roberton Williams III, (University of Maryland and RFF). Within the field of macroeconomics, his interests are focused on measuring the impact of micro-frictions on aggregate outcomes and the implications of those frictions on macroeconomic and monetary policy.

Hall, Keith

Mercatus Center at George Mason University

Dr. Keith Hall is a senior research fellow at the Mercatus Center at George Mason University. Dr. Hall is a recognized expert in the development of simulation models and has conducted or led dozens of economic impact studies. His research interests include labor markets, labor market policy, regulation effects, international trade policy, and economic data. From 2008 until 2012 he served as the Commissioner of the Bureau of Labor Statistics. In this role, he headed the principal fact-finding agency in the Federal Government in the broad field of labor economics and statistics. From 2005 to 2008, Dr. Hall served as Chief Economist for the White House Council of Economic Advisers where he analyzed a broad range of fiscal, regulatory and macroeconomic policies and directed a team that monitored the state of the economy and developed economic forecasts. Prior to that, he was Chief Economist for the U.S. Department of Commerce where he regularly conducted/supervised research projects on a wide range of economic and policy issues; provided technical advice regarding the scope, emphasis, and state of the economic and statistical activities of the Bureau of Census and the Bureau of Economic Analysis; and served as a special advisor to the Secretary of Commerce. Dr. Hall also spent ten years at the U.S. International Trade Commission where, among other things, he conducted and led independent studies related to international trade and trade policy. He authored many different simulation models used by the commission and others. He has been on full time faculty in the Economic Departments at the Universities of Arkansas and Missouri, and has published a number of papers on international trade and international trade policy. Dr. Hall received his B.A. degree from the University of Virginia and his M.S. and Ph.D. degrees in economics from Purdue University.

Harback, Katherine

MITRE Center for Advanced Aviation Systems Development

Dr. Katherine Harback is an expert in the use of computable general equilibrium (CGE) modeling for transportation issues. She is currently leading a project for U.S. Department of Transportation's Office of the Secretary of Transportation, modeling the value of freight rail infrastructure, including economy-wide impacts using CGE modeling and she recently completed work as the leader of a multi-year project modeling the economy-wide impacts of the FAA Next Generation Air Transportation System. Both projects include ground-breaking integration of sector level modeling into the CGE framework. She also has experience and expertise in environmental economics and best practices in cost benefit analysis. Dr. Harback is a member of the Aviation Sustainability Center's Advisory Committee and represents MITRE on the Civil Air Navigation Services Organization Air Traffic Management (ATM) & Environment Workgroup. She is also a member of the Transportation Research Board (TRB) Aviation Economics and Finance Committee. Her work has been published in the Journal of Urban Economics, Transportation Research News, Transportation Research Record, and Transportation Research Forum. Dr. Harback finished her Ph.D. in economics in 2005 at University of Delaware, winning the University's dissertation prize in the social sciences for her research on the economics of airport runway congestion.

Heal, Geoffrey

Columbia University

Dr. Geoffrey Heal is the Paul Garrett Professor of Public Policy and Corporate Responsibility and Professor of Economics and Finance at Columbia Business School and Professor in the School of International and Public Affairs. He is a member of the Executive Committee of the Columbia Earth Institute. Dr. Heal earned a First Class Honors Degree, Cambridge University, U.K. Major in Economics and Minor in Physics (1966). He completed his graduate studies in

Economics and Mathematics at University of California, Berkeley, 1966-67. He earned his Ph.D. in Economics at Cambridge University (1968). Dr. Heal's area of expertise and research include: economic theory, general equilibrium theory, economics of insurance and reinsurance and of risk-management, economics of natural and environmental resources, and the interface between economics and the natural sciences with respect to environmental issues. He has served as Chair of the National Academy – National Research Council Committee on the Valuation of the Services of Aquatic and Related Terrestrial Ecosystems. He is also the Commissioner of the Pews Ocean Commission, Director of the Union of Concerned Scientists and the Beijer Institute of Ecology and Economics of the Royal Swedish Academy of Sciences and a member of the President's Committee on Science and Technology (PCAST) Panel on Biodiversity and Ecosystems. Dr. Heal is also a member and Ex-President, Association of Environmental and Natural Resource Economists.

Hertel, Thomas

Purdue University

Dr. Thomas Hertel is Distinguished Professor of Agricultural Economics at Purdue University, where his research focuses on the economy-wide impacts of global trade and environmental policies. Dr. Hertel is a Fellow, and Past-President, of the Agricultural and Applied Economics Association (AAEA). He is also the founder and Executive Director of the Global Trade Analysis Project (GTAP) which now encompasses more than 10,000 researchers in 150 countries around the world (<https://www.gtap.agecon.purdue.edu/>). This Project maintains a global economic data base and an applied general equilibrium modeling framework which are documented in the book: *Global Trade Analysis: Modeling and Applications*, edited by Dr. Hertel, and published by Cambridge University Press. Dr. Hertel is the inaugural recipient of the Purdue University Research and Scholarship Distinction Award. He has also received a number of awards from the AAEA, including: Quality of Communication, Distinguished Policy Contribution and Outstanding Journal Article.

Hewson, Thomas

Energy Ventures Analysis, Inc.

Since its creation in 1981, Mr. Thomas Hewson has been a principal at Energy Ventures Analysis (EVA), Inc. where he directs the firm's environmental studies. He is the author of EVA's clean air studies and forecasts prices on NO_x and SO₂ emission allowance trading markets. His work includes numerous analyses on emerging future environmental requirements, and their influence on electricity, coal and natural gas emission allowance values. Mr. Hewson has created utility acid rain compliance strategies, developed emission allowance trading business strategies, assessed new generation and pollution control technologies, and conducted environmental and energy audits of commercial properties. Mr. Hewson has authored numerous publicly available reports for the Electric Power Research Institute and trade industry groups on a vast array of energy and environmental issues. Prior to 1981, Mr. Hewson was a project manager at Energy and Environmental Analysis for five years where he directed the firm's environmental studies.

Johnston, Robert J.

Clark University

Dr. Robert J. Johnston is Director of the George Perkins Marsh Institute and Professor of Economics at Clark University. He received a BA in economics from Williams College and a PhD in environmental and natural resource economics from the University of Rhode Island. Dr. Johnston's research addresses methodology for nonmarket valuation, benefit cost analysis, benefit transfer, and analysis of ecosystem services, with an emphasis on aquatic, riparian and coastal systems. He has also conducted significant work in natural resource and fisheries economics. Much of his work coordinates methods and data from environmental economics with those of other natural and social sciences, seeking to enhance interdisciplinary collaborations for policy analysis. His work has been funded by numerous agencies including EPA, National Science Foundation, US Department of Agriculture, National Oceanic and Atmospheric Administration (NOAA), including Sea Grant and the National Estuarine Research Reserve System, US Department of Transportation, and Environment Canada. Among other current appointments, he is on the Ecosystem

Science and Management Working Group of the NOAA Scientific Advisory Board, the Management Committee of the Narragansett Bay National Estuary Program, the Senior Advisory Board of the Connecticut Sea Grant Program, the Program Advisory Council of the New York Sea Grant Program, and the Program Committee for the Charles Darwin Foundation. He has served on numerous National Research Council, EPA, NOAA and other federal agency committees and science advisory workshops, most recently addressing such topics as the effectiveness of stock rebuilding under the Fishery Conservation and Management Reauthorization Act, valuation of ecosystem services within federal agencies, economic benefits of electric utility regulations, indicators of ecosystem services for wetlands and estuaries, indicators of ecosystem services for freshwater streams, ecosystem research within NOAA, and science for valuation of EPA's ecological protection decisions and programs.

Khanna, Madhu

University of Illinois at Urbana-Champaign

Dr. Madhu Khanna is a professor in the Department of Agricultural and Consumer Economics at the University of Illinois at Urbana-Champaign. She received her Ph.D. from the University of California at Berkeley. Her research focuses on environmental policy analysis and incentives for adoption of environmentally friendly technologies. She has examined the effectiveness of alternative market based instruments for inducing the adoption of best management practices in agriculture such as precision farming and improved irrigation methods and the targeting of green payment policies for reducing nitrogen run off and sediment from cropland. She has also examined the motivations and effectiveness of voluntary approaches to environmental protection. Her current work is examining the economics and land use implications of biofuel production. Her research is currently funded by NSF, USDOE and the Energy Biosciences Institute, University of California, Berkeley. Professor Khanna's teaching responsibilities have included undergraduate and graduate courses in international trade and environmental economics. She has received several teaching and research awards and was supervisor of the recipient of an Outstanding Thesis Award in 2002 from the American Association of Agricultural Economics. She was selected as a University of Illinois Scholar for 2004-07 and a Leopold Leadership Fellow of the Woods Institute at Stanford University in 2010. She has served on review panels for the USEPA and the USDA and on the Board of Directors of the Association of Environmental and Resource Economists. She currently serves as the Chair of the Board of the South Asian Network of Development and Environmental Economics and is an Associate Member of the Standing Panel on Impact Assessment of CGIAR (Consortium of International Agricultural Research). She has served on the editorial boards of several agricultural and environmental economics journals and is currently the editor of the *American Journal of Agricultural Economics*.

Knittel, Christopher

Massachusetts Institute of Technology

Dr. Christopher Knittel is the William Barton Rogers Professor of Energy Economics in the Sloan School of Management and the Director of the Center for Energy and Environmental Policy Research at the Massachusetts Institute of Technology (MIT). He joined the faculty at MIT in 2011, having taught previously at UC Davis and Boston University. Professor Knittel received his B.A. in economics and political science from the California State University, Stanislaus in 1994 (summa cum laude), an M.A. in economics from UC Davis in 1996, and a Ph.D. in economics from UC Berkeley in 1999. His research focuses on environmental economics, industrial organization, and applied econometrics. He is a Research Associate at the National Bureau of Economic Research in the Productivity, Industrial Organization, and Energy and Environmental Economics groups. Professor Knittel is an associate editor of *The American Economic Journal -- Economic Policy*, *The Journal of Industrial Economics*, *Journal of Transportation Economics and Policy*, and *Journal of Energy Markets*. His research has appeared in *The American Economic Review*, *The American Economic Journal*, *The Review of Economics and Statistics*, *The Journal of Industrial Economics*, *The Energy Journal* and other academic journals.

Kotlikoff, Laurence

Boston University

Dr. Laurence J. Kotlikoff is a William Fairfield Warren Professor at Boston University, a Professor of Economics at Boston University, a Fellow of the American Academy of Arts and Sciences, a Fellow of the Econometric Society, a Research Associate of the National Bureau of Economic Research, and President of Economic Security Planning, Inc., a company specializing in financial planning software. An active columnist, Dr. Kotlikoff's columns and blogs have appeared in *The New York Times*, *The Wall Street Journal*, *The Financial Times*, the *Boston Globe*, *Bloomberg*, *Forbes*, *Vox*, *The Economist*, *Yahoo.com*, *Huffington Post* and other major publications. In addition, he is a frequent guest on major television and radio stations. Dr. Kotlikoff received his B.A. in Economics from the University of Pennsylvania in 1973 and his Ph.D. in Economics from Harvard University in 1977. From 1977 through 1983 he served on the faculties of economics of the University of California, Los Angeles and Yale University. In 1981-82 Dr. Kotlikoff was a Senior Economist with the President's Council of Economic Advisers. Dr. Kotlikoff is author or co-author of 16 books and hundreds of professional journal articles. His most recent books are *The Clash of Generations* (co-authored with Scott Burns, MIT Press), *The Economic Consequences of the Vickers Commission* (Civitas), *Jimmy Stewart Is Dead* (John Wiley & Sons), *Spend 'Til the End*, (co-authored with Scott Burns, Simon & Schuster), *The Healthcare Fix* (MIT Press), and *The Coming Generational Storm* (co-authored with Scott Burns, MIT Press) and *Generational Policy* (MIT Press). Dr. Kotlikoff has served as a consultant to the International Monetary Fund, the World Bank, the Harvard Institute for International Development, the Organization for Economic Cooperation and Development, the Swedish Ministry of Finance, the Norwegian Ministry of Finance, the Bank of Italy, the Bank of Japan, the Bank of England, the Government of Russia, the Government of Ukraine, the Government of Bolivia, the Government of Bulgaria, the Treasury of New Zealand, the Office of Management and Budget, the U.S. Department of Education, the U.S. Department of Labor, the Joint Committee on Taxation, The Commonwealth of Massachusetts, The American Council of Life Insurance, Merrill Lynch, Fidelity Investments, AT&T, AON Corp., and other major U.S. corporations.

Kreutzer, David

Heritage Foundation

Dr. David Kreutzer is the Research Fellow in Energy Economics and Climate Change at The Heritage Foundation's Center for Data Analysis. In this position, Dr. Kreutzer researches how energy and climate change legislation will affect economic activity at the national, local, and industry levels. Before joining Heritage in February 2008, Kreutzer was an economist at Berman and Company, a Washington-based public affairs firm. From 1984 to 2007, he taught economics at Madison University in Harrisonburg, Va., where he also served as Director of the International Business Program. Kreutzer's research has appeared in journals such as *The Journal of Political Economy*, *the National Tax Journal*, *Economic Inquiry*, *The Southern Economic Journal* and *The Journal of Energy and Development*. He has also written for mainstream media outlets including *The Wall Street Journal*, *The Washington Times*, *the Journal of Commerce*, *the Cleveland Plain Dealer*, and *Fort Lauderdale Sun-Sentinel*. Dr. Kreutzer earned a doctorate in economics from George Mason University in 1984. He also has a bachelor's and master's degrees in economics from Virginia Tech.

Leamer, Edward

University of California – Los Angeles

Dr. Edward Leamer is the Chauncey J. Medberry Professor of Management, Professor of Economics and Professor of Statistics at University of California, Los Angeles (UCLA). He received a B.A. degree in mathematics from Princeton University and a Ph.D. degree in economics and an M.A. degree in mathematics from the University of Michigan. After serving as Assistant and Associate Professor at Harvard University he joined the University of California at Los Angeles in 1975 as Professor of Economics and served as Chair from 1983 to 1987. In 1990 he moved to the Anderson Graduate School of Management and was appointed to the Chauncey J. Medberry Chair. Dr. Leamer is a Fellow of the American Academy of Arts and Sciences, and a Fellow of the Econometric Society. He is a Research Associate of the National Bureau of Economic Research and a visiting scholar at the International Monetary Fund and the Board of

Governors of the Federal Reserve System. He is currently serving as the Director of the UCLA Anderson Forecast. Dr. Leamer has published over 100 articles and 4 books. This research has been supported by continuous grants for over 25 years from the National Science Foundation, the Sloan Foundation and the Russell Sage Foundation. His research papers in econometrics have been collected in *Sturdy Econometrics*, published in the Edward Elgar Series of Economists of the 20th Century. His research in international economics and econometric methodology has been discussed in a chapter written by Herman Leonard and Keith Maskus in *New Horizons in Economic Thought: Appraisals of Leading Economists*.

Litan, Robert

The Brookings Institution

Dr. Robert Litan is a Non-Resident Senior Fellow at Brookings, where he formerly was Vice President and Director of Economic Studies and also a Senior Fellow. In 1993, he was appointed Principal Deputy Assistant Attorney General in the Antitrust Division of the Justice Department, where he oversaw civil non-merger litigation and the Department's positions on regulatory matters, primarily in telecommunications. In 1995, he was appointed Associate Director of the Office of Management and Budget, where oversaw the budgets of five cabinet level agencies. He later was a consultant to the Department of Treasury on financial modernization and the effectiveness of the Community Reinvestment Act and co-authored several reports on these subjects. In the early 1990s he served as a Member of the Presidential-Congressional Commission on the Causes of the Savings and Loan Crisis. He has chaired two panels of two studies for the National Academy of Sciences (NAS), and has served on one other NAS Committee. He began his career as a Staff Economist at the President's Council of Economic Advisers, where he was the CEA staffer for the Regulatory Analysis Review Group (the predecessor to the Office of Information and Regulatory Affairs at OMB). In addition to practicing law (which currently still does as Of Counsel to Korein Tillery, based in St. Louis and Chicago), Dr. Litan has been Vice President and Director of Research at the Kauffman Foundation, and Director of Research at Bloomberg Government, the subsidiary of Bloomberg LLP that provides analysis and data on the impact of government policies on business. He is currently on the research advisory boards of the Smith Richardson Foundation and the Committee for Economic Development. He also been a member of the international advisory board of the Principal Financial Group. During his research career, Litan has authored or co-authored 27 books and edited another 14, and authored or co-authored more than articles in professional and popular publications. His latest books include *The Need for Speed* (Brookings Institution Press, 2013, co-authored with Hal Singer); *Better Capitalism*, co-authored with Carl Schramm, published by the Yale University Press in 2102, and *Good Capitalism, Bad Capitalism* (co-authored with William Baumol and Carl Schramm), also published by Yale in 2007, and which is used widely in college courses, and has been translated into 10 languages. His other books have covered many economic and legal subjects relating to regulation and the global economy. His forthcoming popular book, to be published by Wiley Press in the fall of 2014, is *The Trillion Dollar Economists*. Dr. Litan earned his B.S. in Economics (summa cum laude) at the Wharton School of Finance at the University of Pennsylvania; his J.D. at Yale Law School; and his M. Phil. and Ph.D. at Yale University.

Mathews, Talina

Kentucky Energy and Environment Cabinet

Dr. Talina Mathews is the Director of the Division of Energy Generation, Transmission and Distribution in the Department for Energy Development and Independence, housed in the Kentucky Cabinet for Energy and Environment. Prior to her current position, she was policy advisor to the Chairman of the Public Service Commission. She has more than 15 years of experience in the energy and environmental arena in Kentucky in a variety of roles. She has served as an advisor to executive branch officials, including the Governor, on energy issues. She has performed regulatory impact analyses of state and federal regulations and has studied the impact of changes in federal energy policy on Kentucky. She was involved in the modeling of Kentucky's energy portfolio and impact of higher electricity prices on manufacturing employment. She was an active participant in the Eastern Interconnection States Planning Council. She has an MA and a PhD from the University of Kentucky in economics, with areas of concentration in Environmental Economics and Public Economics. She has been a past president of the Kentucky Economics Association.

Medlock, Kenneth

Rice University

Kenneth B. Medlock III, Ph.D., is the James A. Baker, III, and Susan G. Baker Fellow in Energy and Resource Economics at Rice University's Baker Institute and the senior director of the Center for Energy Studies, as well as an adjunct professor and lecturer in the Department of Economics at Rice University. He is a principal in the development of the Rice World Natural Gas Trade Model, aimed at assessing the future of international natural gas trade. He has published numerous scholarly articles in his primary areas of interest: natural gas markets, energy commodity price relationships, gasoline markets, transportation, national oil company behavior, economic development and energy demand, and energy use and the environment. He also teaches courses in energy economics and supervises Ph.D. students in the energy economics field. Medlock is currently the vice president for conferences for the United States Association for Energy Economics (USAEE), and previously served as vice president for academic affairs. In 2001, he won (joint with Ron Soligo) the International Association for Energy Economics Award for Best Paper of the Year in the Energy Journal. In 2011, he was given the USAEE's Senior Fellow Award, and in 2013 he accepted on behalf of the Center for Energy Studies the USAEE's Adelman-Frankel Award. In 2012, Medlock received the prestigious Haydn Williams Fellowship at Curtin University in Perth, Australia. He is also an active member of the American Economic Association and the Association of Environmental and Resource Economists, and is an academic member of the National Petroleum Council (NPC). Medlock has served as an advisor to the U.S. Department of Energy and the California Energy Commission in their respective energy modeling efforts. He was the lead modeler of the Modeling Subgroup of the 2003 NPC study of long-term natural gas markets in North America, and was a contributing author to the recent NPC study "North American Resource Development."

Metcalf, Gilbert

Tufts University

Dr. Gilbert E. Metcalf is a Professor of Economics at Tufts University and a Research Associate at the National Bureau of Economic Research and MIT's Joint Program on the Science and Policy of Global Change. Dr. Metcalf has taught at Princeton University, the Kennedy School of Government, and MIT. He has frequently testified before Congress, served on expert panels including a National Academies of Sciences panel on energy externalities, and served as a consultant to various organizations. During 2011 and 2012, he served as the Deputy Assistant Secretary for Environment and Energy at the U.S. Department of Treasury. Dr. Metcalf's primary research area is applied public finance with particular interests in taxation, energy, and environmental economics. His current research focuses on policy evaluation and design in the area of energy and climate change using both analytical and computable general equilibrium modeling among other methodologies. He has published papers in numerous academic journals, has edited four books, and has contributed chapters to several books on energy, environmental, and tax policy. Dr. Metcalf received a B.A. in Mathematics from Amherst College, an M.S. in Agricultural and Resource Economics from the University of Massachusetts Amherst, and a Ph.D. in Economics from Harvard University.

Montgomery, W. David

NERA

Dr. David Montgomery is Senior Vice President at NERA Economic Consulting. He is an expert on economic issues associated with petroleum and natural gas markets and climate change policy. He has provided analysis and testimony on energy and environmental issues for more than 30 years, dealing with regulation of oil, gas, and electricity markets; antitrust and mergers; contract disputes; price manipulation; and the design and evaluation of energy- and environment-related policies. His scholarly work is frequently published in peer-reviewed journals, and on numerous occasions Congressional committees have requested his testimony on climate change, environmental regulations, oil and gas markets, and other energy market and environmental issues. He advises clients on the strategic implications of changes in energy and environmental policies and energy markets. He has served as a lead economic witness in high profile litigation, including cases dealing with liability for Methyl Tertiary Butyl Ether (MTBE)

spills, the applicability of the public trust doctrine to U.S. climate policy, an injunction against the enforcement of California's low carbon fuel standard, and in the Continental Forge antitrust litigation alleging a conspiracy to raise natural gas prices in California. Dr. Montgomery's work on economic issues associated with climate change policy has been published frequently in peer-reviewed journals. He was a principal lead author of the Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), Working Group III, and the author of a number of studies of climate change policy over the past 20 years. His testimony on climate change issues has been requested on numerous occasions by the U.S. Congress. Dr. Montgomery directed the development of a set of integrated economic models that set the standard for analysis of the international, national, and industry impacts of energy and environmental policies. Dr. Montgomery has led a number of strategic assessments for clients in the private sector, advising them on how future climate policies and other environmental regulations could affect their asset value, investment decisions, and strategic direction. His recent work includes studies of California's policies to limit greenhouse emissions, energy and climate legislation in the U.S. Congress, and economics of oil and natural gas exports.

Muller, Nick

Middlebury College

Dr. Nick Muller is an Associate Professor of Economics in the Economics Department and the Environmental Studies Program at Middlebury College. Dr. Muller joined the National Bureau of Economic Research as a Faculty Research Fellow in 2012. Dr. Muller earned promotion with tenure in December of 2013. Dr. Muller earned his Ph.D. at Yale, and his Master of Public Administration at Indian University – Bloomington. Dr. Muller served on committees for the United Nations Environment Program and as a consultant to the National Academies of Science. Dr. Muller has also served as an expert witness for the U.S. Department of Justice in air pollution policy compliance litigation. Dr. Muller has extensive experience in research on air pollution damage measurement, and the benefits of air pollution policy in the U.S. Dr. Muller's current research lies in three areas. First, Dr. Muller explores environmental accounting from 1999 to 2008 in the United States economy. This research uses the tools of integrated assessment to measure air pollution damage from each sector in the U.S. economy and then compares such damage to measure of market production (such as GDP or value-added). In sum, this work finds that including air pollution and climate damage into the national income and product accounts increases real rates of growth. This current research builds on Dr. Muller's prior work measuring damages from air pollution that has been published in the *American Economic Review* (2 articles), and by the National Academies of Science. Dr. Muller is also interested in the role that vital statistics play in pollution damage measurement. This research focuses on the uncertainty in human mortality rate measurements and how this uncertainty propagates through an integrated assessment model. Including uncertainty in vital statistics expands the nature of uncertainty typically encompassed by integrated assessment models on air pollution; such models often restrict uncertainty to the value of a statistical life and mortality concentration-response relationships. A third area of Dr. Muller's current research focuses on measuring quality change in energy price indices. This line of inquiry constructs a time series of energy fuel prices from the colonial era to the present and then adjusts these prices by the efficiency with which energy in fuels is converted to usable heat. Like prior authors Dr. Muller finds evidence of a significant divergence between fuel prices and energy service prices. In addition to the work cited above, Dr. Muller has published papers in the journal *Science*, *Journal of Environmental Economics and Management*, *Environmental and Resource Economics*, *Resource and Energy Economics*, *The Journal of Policy Analysis and Management*, *The Energy Journal*, *Environment and Development Economics*, *Nature Climate Change*, *Environmental Science & Technology*, *The Berkeley Electronic Press' Journal of Economic Analysis and Policy* (2), *Water Resources Research*, *Environment International*, and *Environmetrics*.

Opaluch, James

University of Rhode Island

Dr. James Opaluch is Professor and Department Chair of Environmental Economics at the University of Rhode Island. He received a Ph.D. in Natural Resource Economics and Masters Degree in Statistics both from the University of

California, Berkeley. Dr. Opaluch has been actively involved in issues related to natural resource and environmental policy for many years, and is an internationally recognized expert in natural resource valuation and damage assessment. Dr. Opaluch currently serves on the US EPA Science Advisory Board. He has served as an expert in over 25 major natural resource damage assessment cases. Other projects include development of the original Type A model for assessing natural resource damages under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), evaluation of the potential social costs of the national five-year offshore oil and gas leasing program; a comprehensive assessment of alternative bidding systems for auctions for offshore oil; development of a methodology for landfill siting for the state of Rhode Island, and estimating uses and values of the Peconic Estuary System as part of the National Estuaries Program. Dr Opaluch was invited to serve on the United Nations Environmental Program's Working Group of Consultative Experts to provide advice and training to policy professionals throughout the world. Dr. Opaluch has served on a number of national committees, including panels for the National Academy of Science, National Science Foundation, the United Nations, the EPA and the United States Minerals Management Service. He also served on as executive officer and in an editorial capacity for many National and International Professional Associations. Dr. Opaluch has authored or co-authored numerous papers in peer reviewed, professional journals. Dr. Opaluch has ongoing research grants on managing ecosystem services funded by the U.S. Department of Agriculture, and siting renewable energy facilities, funded by the State of Rhode Island.

Paltsev, Sergey

Massachusetts Institute of Technology

Dr. Sergey Paltsev is a Principal Research Scientist at Massachusetts Institute of Technology (MIT), Cambridge, USA, and Assistant Director for Economic Research at the MIT Joint Program on the Science and Policy of Global Change. He is the lead modeler in charge of the MIT Emissions Prediction and Policy Analysis (EPPA) model of the world economy. His research covers a wide range of topics including energy economics, climate policy, taxation, advanced energy technologies, and international trade. Sergey is a Lead Author of the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) and an Advisory Board Member for the Global Trade Analysis Project (GTAP) Consortium. In 2004-2006, Dr. Paltsev served on Second Generation Model Advisory Panel for the U.S. Environmental Protection Agency. Dr. Paltsev is an author of more than 70 peer-reviewed publications in scientific journals and books. Before joining MIT in 2002, Sergey Paltsev worked as a Consultant for International Management and Communication Corporation and The World Bank, and as an Executive Director of the Program in Economics and Management of Technology at Belarusian State University. He received a Diploma in Radiophysics and Electronics from Belarusian State University and PhD in Economics from University of Colorado at Boulder.

Pizer, William

Duke University

Dr. Billy Pizer is Professor at the Sanford School and Faculty Fellow at the Nicholas Institute, both at Duke University. His current research examines how public policies to promote clean energy can effectively leverage private sector investments, how environmental regulation and climate policy can affect production costs and competitiveness, and how the design of market-based environmental policies can address the needs of different stakeholders. From 2008 until 2011, he was Deputy Assistant Secretary for Environment and Energy at the U.S. Department of the Treasury, overseeing Treasury's role in the domestic and international environment and energy agenda of the United States. Prior to that, he was a researcher at Resources for the Future for more than a decade. He has written more than thirty peer-reviewed publications, books, and articles, and holds a Ph.D. and M.A. in economics from Harvard University and B.S. in physics from the University of North Carolina at Chapel Hill.

Revesz, Richard

New York University

Richard L. Revesz, the Lawrence King Professor and Dean Emeritus at New York University School of Law, is one of the nation's leading voices in the fields of environmental and regulatory law and policy. He has published eight books

and 60 articles in major law reviews and journals. His work focuses on the use of cost-benefit analysis, the allocation of regulatory responsibility in a federal system, and the design of liability regimes. In 1994 and 2007, Professor Revesz received the American Bar Association's award for the best article or book on administrative law and regulatory practice published during the prior year. Mr. Revesz currently serves on the National Academy of Sciences' Committee on Science, Technology, and Law, and is a public member of the Administrative Conference of the United States. He is also a fellow of the American Academy of Arts and Sciences and a member of the Council on Foreign Relations. Mr. Revesz graduated summa cum laude from Princeton University, earned a master's degree in environmental engineering from the Massachusetts Institute of Technology, and received his law degree from Yale Law School, where he was editor-in-chief of the *Yale Law Journal*. Following clerkships with Chief Judge Wilfred Feinberg of the U.S. Court of Appeals for the Second Circuit and Justice Thurgood Marshall of the U.S. Supreme Court, Mr. Revesz joined the faculty of NYU School of Law in 1985. He has been a visiting professor at Princeton's Woodrow Wilson School of Public and International Affairs, Harvard Law School, Yale Law School, and the Graduate Institute for International Studies in Geneva, Switzerland.

Rhomberg, Lorenz

Gradient

Lorenz R. Rhomberg, Ph.D. Fellow ATS, is a Principal at Gradient, an environmental consulting firm based in Cambridge, Massachusetts, where he specializes in critical review of toxicological information, weight-of-evidence evaluation, human health risk assessment, quantitative risk analysis, and science policy issues for environmental and consumer chemical exposures. He is a member of several scientific societies, including the Society for Risk Analysis, for which he served as a Councilor from 2002-2004, and as President of the New England Chapter in 1997-1998, as well as the Society of Toxicology, serving as a Councilor of the Risk Assessment Specialty Section from 2003-2005 and Councilor for the Regulatory and Safety Evaluation Specialty Section from 2012-2014. Before joining Gradient in 1999, he was on the faculty of the Harvard School of Public Health. From 1984-1994 he was a risk assessor at the U.S. Environmental Protection Agency in Washington. Dr. Rhomberg earned his Ph.D. in population biology from the State University of New York at Stony Brook and an Honours B.Sc. in biology from Queen's University in Ontario. In 2009, Dr. Rhomberg was named Outstanding Risk Practitioner of the Year by the Society for Risk Analysis, and in the same year was named a Fellow of the Academy of Toxicological Sciences. He has served on seven committees convened by the National Academy of Sciences, two as chair. For the U.S. EPA, he served on several Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panels and on chemical assessment peer review groups, including the 2000 EPA Dioxin Peer Review panel and the recent 2009 public meeting on reassessment issues. He currently sits on the Chemical Assessment Advisory Committee of the EPA Science Advisory Board.

Rose, Adam

University of Southern California

Dr. Adam Rose is Research Professor at the University of Southern California (USC) Price School of Public Policy, and Coordinator for Economics at USC's Department of Homeland Security Center for Risk and Economic Analysis of Terrorism Events (CREATE). Before coming to USC, he served as Head of the Department of Energy and Environmental Economics at The Pennsylvania State University for fourteen years. He received his PhD in Economics from Cornell University. Dr. Rose's main area of research is the economics of energy and climate change policy. As a consultant to the United Nations, he played a major role in the development of the first proposal for a system of globally tradable emission allowances. More recently, he has advised government agencies in several and regions on the development of cap & trade programs and agencies in several states on the employment impacts of climate action plans. Professor Rose has done pioneering research on the aggregate and distributional impacts of climate mitigation policy by advancing methodologies in both computable general equilibrium and macroeconomic modeling. The other major focus of his research is on resilience to natural disasters and terrorism at the levels of the individual business, market, and regional economy. Professor Rose is the author of several books and 200 professional papers, including most recently *The Economics of Climate Change Policy*. He has been appointed to the editorial boards of

several journals including *Resource and Energy Economics*, *Energy Journal*, and *Energy Policy*. He has served on a National Academy of Science panels, a Mineral Management Service Advisory Board, and an EPA Scientific Advisory Board panel. He has also served as the American Economic Association Representative to the American Association for the Advancement of Science, as a member of the Board of Directors of the National Institute of Building Sciences Multi-Hazard Mitigation Council and of the Advisory Board of the Center for National Policy Resilience Forum. Dr. Rose is the recipient of a Woodrow Wilson Fellowship, East-West Center Fellowship, American Planning Association's Outstanding Program Planning Honor Award, Applied Technology Council Outstanding Achievement Award, and Regional Economic Models George Treyz Award for Excellence in Economic Analysis.

Ross, Martin

Duke University

Dr. Martin Ross is a Senior Research Economist at the Nicholas Institute for Environmental Policy Solutions at Duke University, specializing in environmental/energy economics and macroeconomic-simulation modeling. While at the Nicholas institute he has developed the Dynamic Integrated Economy/Energy/Emissions Model (DIEM), which combines a global and U.S. regional macroeconomic simulation (CGE) model with a detailed model of electricity generation in the United States. The model is generally calibrated to energy markets in the U.S. Energy Information Administration's NEMS model and has been applied to a variety of carbon tax and Clean Air Act Section 111(d) proposals. Prior to joining the Nicholas Institute, he was with RTI International where he developed the Applied Dynamic Analysis of the Global Economy (ADAGE) model, which is used by EPA to respond to Congressional requests for legislative analyses. Research conducted for the U.S. EPA Climate Change Division, the Stanford Energy Modeling Forum, and the Pew Center on Global Climate Change has involved using the ADAGE model to estimate U.S. macroeconomic impacts of legislative proposals to reduce GHG emissions. Other modeling by Dr. Ross has included developing a detailed technology model of electricity markets to examine how criteria pollutant and greenhouse gas (GHG) policies affect capacity planning decisions and generation costs. Dr. Ross also spent several years at Charles River Associates and worked in the Office of Policy at the U.S. Environmental Protection Agency.

Rutherford, Thomas F.

University of Wisconsin

Dr. Thomas F. Rutherford is a Professor of Agricultural and Applied Economics at the University of Wisconsin-Madison. He earned a PhD in Operations Research from Stanford University in 1987 under the direction of Alan S. Manne. Dr. Rutherford has subsequently been a faculty member at the University of Western Ontario, the University of Colorado, and the ETH Zurich before joining the University of Wisconsin in 2012. Dr. Rutherford's research focuses on the formulation, solution and application of numerical equilibrium models for economic issues in environmental economics, international trade and economic growth. His work has focused on the economic analysis of global warming, the economic consequences of multi-regional trade agreements, the economic effects of trade reform in small open economies. His research has also included methodological contributions related to the application of complementarity models in economics

Segerson, Kathleen

University of Connecticut

Dr. Kathleen Segerson is a Board of Trustees Distinguished Professor and Alumni Association Distinguished Professor of Economics at the University of Connecticut. She is an environmental economist, with a strong interest in collaborative interdisciplinary work. Her research within economics has focused primarily on the incentive effects of alternative environmental policy instruments, including applications in the following areas: groundwater contamination, hazardous waste management, workplace accidents; land use regulation, climate change and nonpoint pollution from agriculture. In addition, she has been a participant in several projects related to ecosystem services and to the protection of marine species. Dr. Segerson is a fellow of the Association of Environmental and Resource Economists (AERE) and of the American Agricultural Economics Association (AAEA). She is past-president of AERE, and has served

as Vice-President and a member of the AERE Board of Directors. She is currently a co-editor of the new *Journal of the Association of Environmental and Resource Economists* and has previously served as a co-editor and an associate editor of the *American Journal of Agricultural Economics* and an associate editor of the *Journal of Environmental Economics and Management*. Dr. Segerson has been a member of the Chartered Board of the EPA Science Advisory Board (SAB), and has served on several SAB committees, including serving as vice-chair for the Committee on Valuing the Protection of Ecological Systems and Services. She is also currently a member of the Board on Agriculture and Natural Resources of the National Research Council (NRC) of the National Academy of Sciences. Past service also includes several advisory committees for the NRC and the National Science Foundation, including recent service on the NRC Panel on the Review of the National Climate Assessment. She also serves on the Centre Advisory Panel of the Nordic Center on Research on Marine Ecosystems and Resources under Climate Change and the External Advisory Board of the National Socio-Environmental Synthesis Center (SESYNC). Dr. Segerson holds a BA in mathematics from Dartmouth College and a PhD in agricultural and resource economics from Cornell University.

Shimer, Robert

University of Chicago

Dr. Robert Shimer is the Alvin H. Baum Professor in Economics and the College at the University of Chicago. He is a research associate at the National Bureau of Economic Research, a research fellow at the Institute for the Study of Labor (IZA), and a consultant to the Federal Reserve Banks of Atlanta, Chicago, and Minneapolis. He is a fellow of the Econometric Society and the Society of Labor Economists, an elected member of the American Academy of Arts and Sciences, and the recipient of the Sherwin Rosen Prize for Outstanding Contributions in the Field of Labor Economics. Most of Dr. Shimer's research lies at the intersection between Labor Economics and Macroeconomics, focusing on the determination of employment and unemployment rates. He is the author of one book and numerous papers published in top refereed academic journals, including the *American Economic Review*, *Econometrica*, *the Journal of Political Economy*, *the Quarterly Journal of Economics*, and *the Review of Economic Studies*. He is also a past editor of the *Journal of Political Economy*. Dr. Shimer received his B.A. in economics from Yale University in 1990, M.Phil. in economics from Oxford University in 1992, and Ph.D. in economics from the Massachusetts Institute of Technology in 1996. He was an Assistant and Associate Professor at Princeton University from 1996 until he joined the faculty at the University of Chicago in 2003.

Smith, V. Kerry

Arizona State University

Dr. V. Kerry Smith is an Emeritus University Professor of Economics and Emeritus Regents Professor at Arizona State University (ASU). Prior to his retirement, he served as a Regents Professor and W.P. Carey Professor of Economics. He came to ASU in 2006 after serving as University Distinguished Professor and Director, Center for Environmental and Resource Economic Policy in the Department of Agricultural and Resource Economics at North Carolina State University. He is currently a University Fellow at Resources for the Future and a Research Associate with the National Bureau of Economic Research. Dr. Smith received his A.B. and Ph.D. in Economics from Rutgers University. He presented the Frederick V. Waugh Lecture for the American Agricultural Economics Association (AAEA) in 1992 and at the 2002 AAEA annual meeting he was named an AAEA Fellow. In 2004 he was elected a member of the National Academy of Sciences. He is also a Fellow of the Association of Environmental and Resource Economists. Dr. Smith is a member of the American Economic Association, the Southern Economic Association, the Association of Environmental and Resource Economists, and several other professional associations. He has also held editorial positions with the *Journal of the Association of Environmental and Resource Economists*, *the Journal of Environmental Economics and Management*, *Land Economics*, *Review of Economics and Statistics*, and other professional journals. His research interests include non-market valuation of environmental resources, role of public information in promoting private risk mitigation, the linking of ecological and economic models, general equilibrium modeling and welfare analysis for market and nonmarket resources.

Sue Wing, Ian

Boston University

Dr. Ian Sue Wing is an Associate Professor in the Geography Department at Boston University (BU), and a research affiliate of the Center for Energy & Environmental Studies at BU and the Joint Program on the Science & Policy of Global Change at the Massachusetts Institute of Technology (MIT). Dr. Wing holds a Ph.D. in Technology, Management & Policy from MIT and a M.Sc. in economics from Oxford University. Dr. Sue Wing conducts research and teaching on the economic analysis of energy and environmental policy, with an emphasis on climate change and computational general equilibrium (CGE) analysis of economies' adjustment to macroeconomic shocks. His current research includes investigation of the sources of long-run change in the energy intensity of the U.S. economy, the theoretical and empirical performance of absolute versus intensity-based emission limits under economic and environmental uncertainties, the implications of trade-mediated international productivity spillovers for global carbon emissions and leakage, and the performance of different methods of representing endogenous technological change in CGE models for climate change policy analysis. He is currently supported by a grant from the Department of Energy's Office of Science.

Thorning, Margo

American Council for Capital Formation

Dr. Margo Thorning is an internationally recognized expert on tax, environmental, and competitiveness issues. She writes and lectures on tax and economic policy, is frequently quoted in publications such as the Financial Times, *Suddeutsche Zeitung*, *New York Times*, and *Wall Street Journal*, and has appeared internationally on public affairs news programs. Dr. Thorning has made presentations on the economic impact of climate change policy at forums sponsored by the ICCF in China, India, other Asian countries, the European Union, and Russia. Dr. Thorning is coeditor of numerous books on tax and environmental policy, including "Climate Change Policy and Economic Growth: A Way Forward to Ensure Both" and "The U.S. Savings Challenge: Policy Options for Productivity and Growth." Previously, Dr. Thorning served at the U.S. Department of Energy, the U.S. Department of Commerce, and the Federal Trade Commission. Dr. Thorning received a B.A. from Texas Christian University, an M.A. in economics from the University of Texas, and a Ph.D. in economics from the University of Georgia.

Webster, Mort

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Dr. Mort David Webster is an Assistant Professor of Engineering Systems, with a focus on energy and environmental systems. Prof. Webster specializes in risk analysis, uncertainty analysis, and decision-making under uncertainty. He has published numerous peer-reviewed articles in energy and environmental science, economics, and policy, and has served on several national and international panels, including the U.S. Climate Change Science Program. Current research projects include stochastic dynamic modeling of the electric power system focusing on the integration of intermittent renewable generation [funding from the National Science Foundation (NSF)], modeling technological change as a stochastic process and implications for near-term R&D portfolios (funding from NSF and the Department of Energy), and flexible air quality strategies under uncertainty using integrated economic/energy/chemistry regional models (funding from NSF and the EPA). Prof. Webster is active in several research centers at MIT, including the Center for Energy and Environmental Policy Research (CEEPR), the Joint Program on the Science and Policy of Global Change, and the MIT Energy Initiative. Prior to returning to MIT, Prof. Webster was an assistant professor of public policy in the Department of Public Policy at the University of North Carolina at Chapel Hill. He received a Ph.D. (2000) in Engineering Systems and a M.S. (1996) in Technology and Policy from MIT, and a B.S.E. (1988) in Computer Science and Engineering from the University of Pennsylvania.

Wilcoxon, Peter J.

Syracuse University

Dr. Peter J. Wilcoxon is an Associate Professor in the Departments of Economics and Public Administration at Syracuse University's Maxwell School, and he is also a Nonresident Senior Fellow at the Brookings Institution. He is the author or coauthor of three books and more than 50 papers and has won teaching awards at Harvard University and Syracuse University. Dr. Wilcoxon's principal area of research is the effect of environmental and energy policies on economic growth, international trade, and the performance of individual industries. His work often involves the design, construction and use of large-scale intertemporal general equilibrium models. He is coauthor of IGEM, a thirty-five-sector econometric general equilibrium model of the US economy that has been used to study a wide range of environmental, energy and tax policies. He is also coauthor of G-Cubed, a nine-region, twelve-sector general equilibrium model of the world economy that has been used to study international trade and environmental policies. In addition, he is a coauthor of a graduate-level textbook on general equilibrium modeling. Many of his recent publications have focused on national and international policies to control climate change. Dr. Wilcoxon received his BA in physics from the University of Colorado and his AM and PhD in economics from Harvard University. His past positions include Associate Professor of Economics, the University of Texas at Austin; Assistant Professor of Economics, the University of Texas at Austin; Visiting Fellow, the Brookings Institution; Visiting Scholar, Harvard University, and Senior Research Fellow, the University of Melbourne in Australia. In addition, he has served on EPA's Environmental Economics Advisory Committee. Dr. Wilcoxon's research has been supported by EPA, the National Science Foundation, the Department of Energy, and private sector organizations.

Williams, Roberton

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Dr. Roberton C. Williams III is an Associate Professor in the Department of Agricultural and Resource Economics at the University of Maryland, College Park, Senior Fellow and Director of Academic Programs at Resources for the Future, and a Research Associate of the National Bureau of Economic Research. Before moving to Maryland, he was an Associate Professor of Economics at the University of Texas at Austin, and he has previously held visiting research positions at the Brookings Institution and Stanford University. He has served as a Co-Editor of the *Journal of Public Economics* and *the Journal of Environmental Economics and Management*. He holds a Ph.D. from Stanford University and an A.B. from Harvard College, both in economics. Dr. Williams's research focuses primarily on taxation and environmental regulation, covering broad theoretical questions such as how to measure the effects of taxes and regulations on economic efficiency as well as specific policy issues such as gasoline taxation and climate change policy.

Zycher, Benjamin

American Enterprise Institute

Dr. Benjamin Zycher is the John G. Searle scholar at the American Enterprise Institute, a senior fellow at the Pacific Research Institute, and a member of the advisory board of the quarterly journal *Regulation*. He is a former associate in the Intelligence Community Associates program of the Office of Economic Research, Bureau of Intelligence and Research, U.S. Department of State, a former senior fellow at the Manhattan Institute for Policy Research, a former senior economist at the RAND Corporation, a former member of the Board of Directors of the Western Economic Association International, a former adjunct professor of economics at the University of California, Los Angeles, a former adjunct professor of economics and business in the MBA program at the California State University, Channel Islands, a former vice president for research at the Milken Institute, the founding editor of the quarterly public policy journal *Jobs & Capital*, a former senior staff economist at the President's Council of Economic Advisers, and a former member of the advisory board of *Consumer Alert*. He holds a Ph.D. in economics from the University of California Los Angeles and a Master of Public Policy from the University of California - Berkeley. He has done considerable work on energy and environmental policy, on health care policy and the economics of the pharmaceutical sector, on the economics of the insurance sector, and on such varying topics in international economics as counterterrorism policy,

resource dependence, and the risk of "shocks." He has done a substantial amount of work as well on the economic and political effects of government regulation, taxation, spending, and debt, on benefit/cost analysis of public expenditures, on the effects of economic institutions and performance upon economic growth and resource use, on long-term trends in economic performance and military capability, on the use of trade policy in pursuit of foreign policy goals, and on measures of burden sharing within alliances.