Committee on Risk Management and Governance Issues in Shale Gas Development

Chair

Mitchell Small is H. John Heinz Professor of Civil and Environmental Engineering & Engineering and Public Policy at Carnegie Mellon University. His specializations are in mathematical modeling of environmental quality, statistical methods and uncertainty analysis, human exposure modeling, human risk perception and decision making; with applications to drinking water, air toxics; leak detection at geologic gas storage and recovery sites, and groundwater risk assessment. He served as associate editor for *Environmental Science & Technology* (1995-2011), and is an Elected Fellow of the Society for Risk Analysis (SRA) (December 2003). He has a B.S. from Carnegie Mellon University, and a M.S. and Ph.D. from the University of Michigan.

Members

Susan Christopherson is professor in the Department of City and Regional Planning at Cornell University. She is an economic geographer whose research and teaching focus on economic development, urban labor markets, and location patterns in service industries, particularly the media industries. Her research includes both international and U.S.-policy-oriented projects. Her international research includes studies in Canada, Mexico, China, Germany, and Jordan as well as multi-country studies. In the past three years she has completed studies on advanced manufacturing in New York's Southern Tier, the photonics industry in Rochester, the role of universities and colleges in revitalizing the upstate New York economy, and production trends affecting media industries in New York City. She has written more than 50 articles and 25 policy reports on topics in economic geography and economic development. Her current projects include studies of phoenix industries in old industrial regions and a comprehensive economic impact analysis of natural gas drilling in the Marcellus Shale in New York and Pennsylvania. Christopherson received her Ph.D. from the University of California-Berkeley.

Abbas Firoozabadi is director and senior scientist at the Reservoir Engineering Research Institute, Palo Alto, CA and Adjunct Professor of Chemical & Environmental Engineering at Yale University. His research concerns: (1) mathematical modeling of CO2 injection in the subsurface for improved hydrocarbon recovery and sequestration; (2) nano-particles in transport in flowline and oil capture; (3) production of methane and other light hydrocarbons from shale resources; and (4) irreversible phenomena in hydrocarbon reservoirs. He holds M.S. and Ph.D. degrees in gas engineering from Illinois Institute of Technology and a B.S. degree in Gas Engineering from Abadan Institute of Technology.

Bernard D. Goldstein is professor emeritus in the Department of Environmental and Occupational Health and former Dean of the University of Pittsburgh Graduate School of Public Health, is an environmental toxicologist whose research interests have focused largely on the concept of biological markers in the field of risk assessment. He has published in the areas of blood toxicity, the formation of cancer-causing substances (free radicals) following exposure to inhalants, various aspects of public health decision-making and global issues in environmental medicine. Before coming to the University of Pittsburgh, Dr. Goldstein was professor and chairman of the department of environmental and community medicine at the University of Medicine and Dentistry of New Jersey-Robert Wood Johnson Medical School, where he established and directed the largest academic environmental and occupational health program in the United States -- the Environmental and Occupational Health Sciences Institute. He also has served as an officer with the U.S. Public Health Service and as assistant administrator for research and development at the U.S.

Environmental Protection Agency. Dr. Goldstein received his medical degree from New York University and undergraduate degree from the University of Wisconsin.

Robert B. Jackson is professor of biology at Duke University. He was a Department of Energy Distinguished Postdoctoral Fellow for Global Change at Stanford University and an assistant professor at the University of Texas before joining the Duke faculty in 1999. He is currently Director of Duke's Center on Global Change and Duke's Stable Isotope Mass Spectrometry Laboratory. He also directs the Department of Energy-funded National Institute for Climate Change Research for the southeastern U.S. and co-directed the Climate Change Policy Partnership, working with energy and utility corporations to find practical strategies to combat climate change. Jackson has received numerous awards, including the Murray F. Buell Award from the Ecological Society of America, a 1999 Presidential Early Career Award in Science and Engineering from the National Science Foundation. He has a B.S. in chemical engineering from Rice University, and an M.S. in statistics, an M.S. in ecology, and a Ph.D. from Utah State University.

D. Warner North is president and principal scientist of NorthWorks, Inc., a consulting firm in Belmont, California. He previously served as a consulting professor in the Department of Management Science and Engineering at Stanford University. He has carried out applications of decision analysis and risk analysis for electric utilities, for the petroleum and chemical industries, and for government agencies with responsibility for energy and environmental protection. He has served as a member and consultant to the Science Advisory Board of the US Environmental Protection Agency since 1978 and as a member of the US Nuclear Waste Technical Review Board (1989-1994). He has served on multiple National Research Committees working on issues in risk assessment and decision making. He is a past president of the Society for Risk Analysis and a recipient of the Frank P. Ramsey Medal from the Decision Analysis Society for lifetime contributions to the field of decision analysis. He received his Ph.D. in operations research from Stanford University and his B.S. in physics from Yale University.

Aseem Prakash is a professor of political science and the Walker Family Professor for the College of Arts and Sciences at the University of Washington. Professor Prakash studies environmental issues, international political economy, and NGO politics. His work focuses on voluntary environmental programs, corporate social responsibility, and voluntary regulation in the nonprofit sector, among other topics. His books include *Greening the Firm: The Politics of Corporate Environmentalism* (2000) and *The Voluntary Environmentalists: Green Clubs, ISO 14001, and Voluntary Environmental Regulations* (2006). He is the founding, General Editor of the Cambridge University Press Series on Business and Public Policy and the co-editor of Journal of Policy Analysis and Management. He holds a joint Ph.D. from the Department of Political Science and the School of Public and Environmental Affairs (SPEA) at Indiana University, Bloomington, an MBA degree from the Indian Institute of Management, Ahmedabad, and a B.A. from St. Stephen's College, University of Delhi.

Barry Rabe is J. Ira and Nikki Harris Family Professor of Public Policy and Arthur F. Thurnau Professor of Environmental Policy at the Gerald R. Ford School of Public Policy at the University of Michigan, where he also directs the Center for Local, State, and Urban Policy. His research examines the adoption and implementation of policies relevant to climate change, environmental protection and energy, with particular attention to the role of state governments in the American federal system. His work also examines other federal systems such as Canada, as well as the link between public opinion and policy development. He holds M.A. and Ph.D. degrees from the University of Chicago and a B.A. degree from Carthage College.

Susan Tierney is a principal in the Analysis Group. Dr. Tierney is an expert on energy policy and economics, specializing in the electric and gas industries. She has consulted to companies, governments, non-profits, and other organizations on energy markets, economic and environmental regulation and strategy, and energy facility projects. Her expert witness, business consulting, and arbitration services have involved industry restructuring, market analyses, regulatory policies for renewables and energy efficiency, transmission planning, siting and cost-allocation, wholesale and retail market design, contract disputes, resource planning, resource procurement analysis, market monitoring, and asset valuations. In addition, Dr. Tierney's work has covered regional transmission organizations, siting of generation and transmission facilities and natural gas pipeline projects, natural gas markets, electric system reliability, and environmental policy and regulation. A former Assistant Secretary for Policy at the U.S. Department of Energy and state public utility commissioner, she is a member of the Bipartisan Policy Center's energy project and the Secretary of Energy's Advisory Board. She has been appointed to the National Petroleum Council. Dr. Tierney also serves as an ambassador for the U.S. Clean Energy Education & Empowerment program, an initiative of the Department of Energy and MIT. She has published widely, and frequently speaks at industry conferences. She served on the DOE's 90 Shale Gas committee. She has a Ph.D. in regional planning from Cornell University.

Barbara Zielinska is research professor and the director of the Organic Analytical Laboratory at the Desert Research Institute. Prior to coming to DRI, she was an associate research Chemist for the Statewide Air Pollution Research Center, University of California, Riverside, where she conducted research on the mechanism of formation of mutagenic derivatives of polycyclic aromatic hydrocarbons under the influence of gaseous atmospheric pollutants. Her current primary research interests include development of measurement methods for organic compounds present both in gas- and particle phases in ambient air and emission sources; atmospheric transformations of organics; and exposure measurements to hazardous air pollutants. She served three consecutive terms (from 2000 to 2006) as a member of the US EPA Clean Air Scientific Advisory Committee (CASAC). She has a M.S. in chemistry from the Technical University of Lodz, Poland, and a Ph.D. in chemistry from the Polish Academy of Sciences.

Study Director

Paul C. Stern is a senior scholar at the National Research Council/National Academy of Sciences, working primarily with the Board on Environmental Change and Society, formerly known as the Committee on Human Dimensions and Global Change. He has directed numerous studies at the National Research Council, including *Understanding Risk: Informing Decisions in a Democratic Society* (1996), *Decision Making for the Environment: Social and Behavioral Science Priorities* (2005), and *Public Participation in Environmental Assessment and Decision Making* (2008). His research interests include the determinants of environmentally significant behavior, particularly at the individual level; participatory processes for informing environmental decision making; processes for informing environmental decisions; and the governance of environmental resources and risks. He is coauthor of the textbook *Environmental Problems and Human Behavior* (2nd ed., 2002) and of the 2003 article "The Struggle to Govern the Commons," which won the 2005 Sustainability Science Award from the Ecological Society of America. He is a fellow of the American Association for the Advancement of Science and of the American Psychological Association. He holds a B.A. from Amherst College and an M.A. and Ph.D. from Clark University, all in psychology.