

## BENJAMIN F. HOBBS

Department of Geography and Environmental Engineering, Whiting School of Engineering  
Environment, Energy, Sustainability & Health Institute  
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### EDUCATION

**Cornell University**, School of Civil and Environmental Engineering, Ithaca, NY. Ph.D., Environmental Systems Engineering, Jan. 1983. Minors: Operations Research and Resource Economics.

**State University of New York**, College of Environmental Science and Forestry, Syracuse, NY. M.S., Resources Management and Policy, May 1978.

**South Dakota State University**, Brookings, SD. B.S. with Highest Honor, May 1976. Major: Non-Major (self-designed program integrating environmental science, mathematics, economics).

**Prescott College**, Prescott, AZ. Sept. 1972 - May 1974.

### EMPLOYMENT

**The Johns Hopkins University**, Whiting School of Engineering, Baltimore, MD.

- Inaugural Director, Environment, Energy, Sustainability & Health Institute, 2010 to present.
- Inaugural Theodore K. and Kay W. Schad Professor of Environmental Management, 2008 to present.
- Co-Director, Yale-JHU SEARCH (Solutions for Energy, Air, Climate, and Health) Center, 2016 to present
- Professor of Geography & Environmental Engineering, 1995 to present
- Chairman of Geography & Environmental Engineering, July 2002-June 2003; Acting Chair July-August 2004
- Professor of Applied Mathematics and Statistics (secondary appointment), 1999 to present.

Teaching, research in optimization, decision analysis, simulation, and economics, and their application to environmental, power, and water systems. Courses taught: environmental systems simulation and decision analysis; energy planning and policy modeling; introductory optimization; engineering microeconomics; advanced environmental engineering applications of optimization; ecosystem management models.

**Case Western Reserve University**, Case School of Engineering, Cleveland, OH.

- Assistant Professor of Systems Engineering, Jan. 1984 to Feb. 1988.
- Assistant Professor of Civil Engineering, Sept. 1986 to Feb. 1988.
- Associate Professor of Systems Engineering and Civil Engineering, Feb. 1988 to June 1994.
- Professor of Systems, Control, and Industrial and Civil Engineering, July 1994 to July 1995.
- Adjunct Professor of Electrical Engineering and Computer Science, Aug. 1995 – June 2000.

Courses taught: reliability and risk analysis; water and energy systems engineering; decision analysis; mathematical modeling; engineering economics and financial accounting; introduction to systems engineering; legal, economic and social aspects of resources management.

**Oak Ridge National Laboratory**, Energy Division, Wigner Fellow, Jan. 1982 to Jan. 1984. Research on water supply for electric power, energy planning in developing countries, power markets, spatial market economics. Sponsors: Electric Power Research Institute, US Agency for Intl. Development, Wigner Fellowship program.

**Brookhaven National Laboratory**, Division of Regional Studies, Upton, NY. Economics Associate III. Sept. 1977 to Aug. 1978, Summer 1979. Research on power plant siting, water supply for power, northeastern coal markets. Sponsors: US Department of Energy, US Nuclear Regulatory Commission.

Summer positions with the **Maryland Power Plant Siting Program**, Annapolis, MD (1977), **Oak Ridge National Laboratory**, Energy Division, Regional & Urban Studies Section, Oak Ridge, TN (1975, 1976), **Northeast Utilities**, Dept. Regional & Environmental Planning, Berlin, CT (1974). Internships with the **Salt River Project**, Phoenix, AZ (March - April, 1974), **The President's Council on Environmental Quality**, Washington, DC (April - May, 1973).

## VISITING APPOINTMENTS

Visiting Scholar, Institute for Research in Technology, ICAI School of Engineering, Comillas Pontifical University, Madrid, Spain, Jan.-March, 2017.

Visiting Associate, Computing & Mathematical Sciences, California Institute of Technology, Pasadena, CA, Nov.-Dec. 2016.

Visiting Scholar, Department of Electrical Engineering, University of Washington, Seattle, WA, July-October 2016.

Overseas Fellow, Churchill College, Cambridge, Aug. 2009-July 2010.

Senior Research Associate, Electricity Policy Research Group, Department of Economics and Judge Business School, University of Cambridge, Aug. 2009-July 2010.

Visiting Researcher, Energieonderzoek Centrum Nederland (ECN, Netherlands Energy Research Foundation), Policy Studies Unit, Amsterdam, The Netherlands, Sept. 2001 – July 2002.

Visiting Professor, Systems Analysis Laboratory, Helsinki University of Technology, Espoo, Finland, Aug. 2000.

Visiting Professor, Dept. of Geography & Environmental Engineering, The Johns Hopkins University, Baltimore, MD, Aug. 1995 – June 1996.

Visiting Scientist, Dept. Civil Engineering, University of Washington, Seattle, WA, Sept. 1991 – Nov. 1992.

## CONSULTING

PJM, LLC, 2013

Booz & Company, Long Term Transmission Rights Workshop, 2011

UK Office of Gas & Electricity Markets, TransmiT Project, 2010-2011

Maryland Dept. of the Environment and University of Maryland, 2010-2011

Lawrence Berkeley Laboratory, City of Auburn Technical Advisory Group, 2010-2011

FinGrid (Finnish Network Operator), 2010

Brattle Group, 2008

U.S. Army Corps of Engineers, Baltimore District, 2006, 2007

U.S. Dept. of Energy, Energy Information Agency, 2000, 2006

Maryland Power Plant Research Program, 2003

Planit Management, Ltd., 2001

Federal Energy Regulatory Commission, 1996-2001

Analysis Group/Economics, 1999

Gas Research Institute, Chicago, IL, 1991, 1994, 1997-1999

U.S. Army Corps of Engineers, Institute of Water Resources, Ft. Belvoir, VA, 1984-1998

Commonwealth Energy, 1998  
 Electric Power Research Institute, 1997  
 Edison Source and Resource Management Intl., 1996  
 Northeast Ohio Sewer District, Cleveland, OH, 1995  
 BC Gas, Ltd., Vancouver, BC, 1994-95  
 Ontario Hydro, Toronto, ONT, 1995  
 BC Hydro, Vancouver, BC, 1995-96  
 Decision Systems International, Atlanta, GA, 1994-95  
 Oak Ridge National Laboratory, Oak Ridge, TN, 1994  
 Energy & Environmental Economics, Inc., San Francisco, CA, 1994  
 IDEA, Inc., Washington, DC, 1992-1994  
 U.S. Army Corps of Engineers, Detroit District, 1994  
 National Regulatory Research Institute, Columbus, OH, 1989-1994  
 Seattle City Light, Resource Planning and Analysis Group, Seattle, WA, 1991-1992  
 Utility Air Regulatory Group, Washington, DC, 1991  
 South Florida Water Management District, West Palm Beach, FL, 1989  
 Hamilton, Rabinovitz, and Szanton, Los Angeles, CA, 1980-1981  
 New York Department of Law, New York, NY, 1981  
 Brookhaven National Laboratory, Upton, NY, 1980  
 Argonne National Laboratory, Argonne, IL, 1980

## HONORS

Presidential Young Investigator Award, National Science Foundation, 1986-1991.

### ***Fellowships:***

- Fellow, Institute for Operations Research & Management Science (INFORMS), 2010.
- Fellow, Institute of Electrical and Electronics Engineers (IEEE), 2008
- Guest Professor, School of Electrical Engineering, Southeast University, Nanjing, 2013-2014
- Overseas Fellow, Churchill College, Cambridge, UK 2009-2010
- Economic & Social Research Council/Social Science Research Council (UK) Collaborative Visiting Fellowship 2010
- Wigner Fellow, Oak Ridge National Laboratory, 1982-84.
- Sage Fellow (1979-80) and McMullen Fellow (1978-79), Cornell University.

### ***Paper Awards:***

- 2016 Runner-Up, Best student paper, Decision Analysis Society (INFORMS), and 2016 Runner-Up for the *Decision Analysis* Journal Special Recognition Award (for Venkat, Clemen, Hobbs, and Kenney, Decision Analysis, 2016).
- 2014 Best Publication Award in Energy, INFORMS Section on Energy, Natural Resources, & Environment for the period 2010-2012 (for Zhao, Hobbs, and Pang, Operations Research, 2010)
- 2014 Best Publication Award Environment-Sustainability, INFORMS Section on Energy, Natural Resources, & Environment (for Chen, Liu, and Hobbs, Operations Research, 2011)
- 2013 Editor's Choice Award, Water Resources Research (for Kenney, Hobbs et al., WRR, 2013).
- 2007 Best Publication Award (Energy), INFORMS Energy, Natural Resources, & Environment Area (for Harrington, Hobbs, et al., Mathematical Programming Series B, 2005)
- 2006 Bright Idea Award, New Jersey Policy Research Organization and Stillman School of Business at Seton Hall University (for R.P. O'Neill, P.M. Sotkiewicz, B.F. Hobbs et al., European J. Operational Research, 2005)

- 2004 Decision Analysis Publication Award (for the best Decision Analysis publication in 2002), Decision Analysis Society of INFORMS (for Anderson and Hobbs, “Using a Bayesian Approach to Quantify Scale Compatibility Bias,” Management Science, 2002)
- First Place, INFORMS Energy, Natural Resources, and Environment Section, Student Paper Competition, November 2004 (Second author and advisor to Yihsu Chen for Chen and Hobbs, “An Oligopolistic Power Market Model with Tradable NO<sub>x</sub> Permits,” IEEE Transactions on Power Systems, 2005)
- Second Place, INFORMS Decision Analysis Section, Student Paper Competition, November 2001 (Second author and advisor to R. Anderson)
- 1990 Outstanding Research Oriented Paper, American Society of Civil Engineers (ASCE) Water Resources Planning and Management Division (for “Risk Analysis of Aquifer Contamination by Brine”, ASCE JWRPM, 1988)

***Invited Plenary Speaker:***

- 2013 Asia-Pacific Economic Coordination (APEC)-China State Grid-China Electric Power Research Institute Symposium on Demand Response, June 6, 2013, Nanjing China.
- 48<sup>th</sup> Allerton Conference on Communication, Control, and Computing, UIUC, Oct. 1, 2010
- Stochastics and Risk Modelling for Energy and Commodity Markets, Innovative Approaches in Economics, Finance and Engineering, International Ruhr Energy Conference, 4 – 6 Oct. 2009, Duisburg-Essen University, Germany
- International Association of Energy Economists, 10<sup>th</sup> European Conference, Vienna, 7-10 Sept. 2009
- Trans-Atlantic INFRADAY, Conference on Applied Infrastructure Modeling and Policy Analysis, Critical Infrastructures in Energy and Other Networked Industries, College Park, Maryland, Nov. 2007
- International Association of Energy Economics European Meeting, Prague, June 2003
- International Conference on Complementarity Problems, Cambridge, July 2002

Certificate for Outstanding Service, The National Academies, Board on Environmental Studies and Toxicology, 2006.

2005 “Significant Reviewer” Award, IEEE Transactions on Power Systems

Mortar Board, 1991 Outstanding Professor Award, Case Western Reserve University, April 1991.

Nominated for John S. Diekhoff Award for Outstanding Graduate Teaching, Case Western Reserve University, March 1988 and March 1991.

ASCE Energy Division Nominee for the ASCE Walter L. Huber Civil Engineering Research Prize, May 1985.

Rhodes Scholarship Nominee from South Dakota State University, 1975.

**PROFESSIONAL ACTIVITIES**

**Research Institute Affiliations**

Associate Researcher, Energy Policy Research Group, University of Cambridge, UK, 2005-Present

Scientific Advisor, Policy Studies Unit, Energieonderzoek Centrum Nederlands (ECN), Amsterdam, The Netherlands, 2003-2008, 2011-Present.

Principal Investigator, National Center for Earthsurface Dynamics, University of Minnesota (NSF Science and Technology Center), 2005-2012

Institute Associate, National Regulatory Research Institute, Columbus, OH, 1989-1995.

Ameritech Fellow, Center for Regional Issues, Case Western Reserve University, Cleveland, OH, 1987, 1988, 1989.

## **Advisory Boards**

Chair, Market Surveillance Committee, California Independent System Operator, Folsom, CA, 2010-Present; Member, 2002-2010.

Member, Mitigation Working Group, State of Maryland Commission on Climate Change, 2015-16.

Member, Stakeholder Advisory Group, Grid Modernization Laboratory Consortium, 2016-17.

Advisory Board, Maryland Clean Energy Center, 2014-2015.

Private Universities Representative appointed by Governor O'Malley, Maryland Offshore Wind Business Development Fund Advisory Committee, 2013-2014.

Member, Public Interest Advisory Committee, Gas Technology Institute, Chicago, 2003-2013.

Member, Technical Advisory Committee, Planning Tool Development for Prioritization of Louisiana Coastal Protection and Restoration Alternatives, Rand Corporation and State of Louisiana Coastal Protection and Restoration Authority, 2010-2012.

Member, Energy Master Plan Advisory Panel, State of New Jersey, September 2007

Member, Expert Advisory Board, New Jersey Sustainable State Institute, New Brunswick, NJ, 2006.

Member, National Research Council Committee on Changes in New Source Review Programs for Stationary Sources of Air Pollutants, 2004—2006.

Affiliate, Energy and Environmental Economics, Inc., San Francisco, CA

## **Editorial Service**

Competition and Regulation in Network Industries, Editorial Board, 2009-Present

Economics of Energy & Environmental Policy, IAEE, Editorial Board, 2011-Present

Energy Economics, Associate Editor, 2007-Present

EURO Journal on Decision Processes, Editorial Board, 2012-Present.

Journal of Energy Markets, Editorial Board, 2007-Present

Journal of Energy Engineering (ASCE), Associate Editor, 2007-Present

IEEE Transactions on Power Systems, Editorial Board, 2005-2015.

Power Engineering Letters (IEEE), Editorial Board, 2005-2015.

Journal of Infrastructure Systems (ASCE), Associate Editor, 2003-2009

Energy, The International Journal, Associate Editor, 1996-2013

The Electricity Journal, Editorial Board, 1995-Present

Area Editor, Environment and Natural Resources, Operations Research, 1996-2005

Deputy Editor, Systems Analysis and Economics, Water Resources Research, 1997-2000.

Energy Services Journal, The Journal of the Association of Energy Services Professionals, 1995-1996

Water Resources Research, Associate Editor, 1988-1995

## **Professional Organizations and Service**

Co-organizer, KAPSARC Economics Workshop and Career Paths Workshop, George Washington University, Oct. 3-4, 2013

Co-organizer and Co-Founder, Atlantic Energy Group (formerly the East Coast Energy Group), 2003-Present

Past Chairman, Executive Committee, Energy Division, American Society of Civil Engineers (ASCE), 1999-2000 (Chair, 1998-1999; Vice Chair, 1997-1998; Secretary 1996-1997)

Chairman, Sessions Committee, ASCE Energy Division, 1992-2000; Organizer of ASCE sessions for American Power Conference

Organizer, 8<sup>th</sup> YEEES (Young Energy Economists & Engineers Seminar), University of Cambridge, April 8-9, 2010

Co-Organizer, Workshop on "Policy-Making Benefits and Limitations from using Financial Methods and Modelling in Electricity Markets," UK Energy Research Centre, July 2008, London, UK.

Co-organizer and Co-chairman, "European Science Foundation Exploratory Workshop on Mathematical Models for Electricity Markets," Castilla-La Mancha University, Ciudad Real, Spain, July 13-14, 2006.

Invited Papers Co-Chair, INFORMS National Meeting, Washington, DC, 2008  
 INFORMS Subdivisions Council, Sections Representative, 2004-2005  
 Contributed Papers Chair, INFORMS National Meeting, Philadelphia, Nov. 1999  
 Member, Systems Economics Committee and Working Group, IEEE Power Engineering Society  
 Member, Emissions Task Force, IEEE Power Engineering Society, 1992-96  
 Member, Northeast Ohio Areawide Coordination Agency Task Force on Hazardous Material  
 Transportation, 1990-95  
 Member, Northeast Ohio Environmental Priorities Project, Quality of Life Committee, 1994-95.  
 Chairman, Awards Committee, ASCE Energy Division, 1995-Present  
 Chairman and Control Member, Energy Resources Management Committee, ASCE Energy Division, 1985-91  
 Member, Task Committee on Groundwater Monitoring Network Design, ASCE Hydraulics Division, 1988-90  
 Member, Task Committee, Risk and Reliability Analysis of Water Distribution Systems, ASCE Hydraulics Div., 1986-1988  
 Member of American Society of Civil Engineers, Institute for Operations Research and Management Science, International Association for Energy Economics, IEEE

### **Recent University Service**

SPH-WSE Environment Health Sciences-DoGEE Restructuring Committee, Co-Chair, Nov. 2014-February 2015.  
 Founding Director, E<sup>2</sup>SHI (Environment, Energy, Sustainability & Health Institute), 2010-Present  
 Public Interest Investment Advisory Committee (Advisory Committee to JHU Board of Trustees), 2015-Present  
 Member, Sustainability Hopkins Investment Evaluation Committee, 2011-2015  
 JHU Whiting School of Engineering, Graduate Curriculum Committee, 2006-2009, 2011-Present  
 Undergraduate Program Coordinator, DOGEE, 2003-Present  
 Chair, JHU President's Climate Change Task Force, 2008-2009  
 Program Committee for the Technical Management and Systems Engineering Programs, Engineering and Applied Science Programs for Professionals, JHU, 2007-2009, 2011-Present  
 Homewood Tenure and Promotion Policies Committee, 2012-2013  
 Chair, DOGEE Systems and Economics Search Committees, 2004-2007  
 Homewood Academic Council, JHU (Responsible for Homewood Campus Promotion & Tenure Recommendations and Academic Regulations) 2000-2005.  
 Ad Hoc Committee on Academic Council Composition, JHU, 2007.

### **SPONSORED RESEARCH**

- Mid-Atlantic Regional Integrated Sciences and Assessments (MARISA) program (NOAA, 5 years starting 9/2016, JHU share \$425K; D. Knopman (RAND) Director; B. Hobbs JHU Co-Director).
- Yale-JHU SEARCH (Solutions for Energy, Air, Climate, and Health) Center (\$3M, JHU Portion; M. Bell (Yale) Director; B. Hobbs JHU Co-Director), 1/16-1/21
- "Co-Optimization and Anticipative Planning Methods For Bulk Transmission And Resource Planning Under Long-Run Uncertainties" (\$250K, JHU Portion; J. McCalley (ISU) Director), 10/14-2/18
- "Collaborative Research: Commitment, Expansion, and Pricing in Uncertain Power Markets: Discrete Hierarchical Models and Scalable Algorithms," (\$160K, JHU portion; U. Shambhag (Penn State), PI; B. Hobbs, JHU CoPI), 7/14-6/17
- "Coastal SEES Collaborative Research: Morphologic, Socioeconomic and Engineering Sustainability of Massively Anthropic Coastal Deltas: the Compelling Case of the Huanghe," (\$298K JHU portion; B. Hobbs JHU CoPI; J. Nittrouer, Rice U, PI; M. Lamb, CalTech, CoPI; G. Parker, UIUC, Co-PI; G. Kineke, Boston C., CoPI), 9/14-6/18.

- "IBSS-Ex: Integrating social science and systems methodologies for sustainability: Promoting appropriate waste disposal practices in low-income neighborhoods disposal practices in low-income neighborhoods" (\$250K; P. Winch, PI; C. Parker and B. Hobbs, CoPIs), \$250K, 8/14 – 6/16.
- WECC Demonstration of Long-Term Transmission Planning Considering Long Run Uncertainty, Resource-Transmission Co-optimization, and Variability, Western Electricity Coordinating Council and LBNL, \$160K, 5/14-6/15
- "Study - Co-Optimization of Transmission with other Resources - Demonstration," National Association of Regulatory Utility Commissioners," (\$45K JHU portion; R. Johnson, Energy Exemplar, PI; J. McCalley, ISU CoPI; B. Hobbs JHU CoPI), 8/14-1/15.
- "Co-Optimization and Anticipative Planning Methods for Bulk Transmission and Resource Planning Under Long-Run Uncertainties", Bonneville Power Administration, 9/14-6/17 (\$234K, JHU Portion; J. McCalley, ISU, PI; S. Guikema, JHU PI; B. Hobbs, CoPI)
- "Performance and Effectiveness of Green Infrastructure Stormwater Management Approaches in the Urban Context: A Philadelphia Case Study." 2013-2016 (\$1M, A. McGarity, Swarthmore College, PI; B. Hobbs CoPI)
- "PIRE: USA/Europe Partnership for Integrated Research and Education in Wind Energy Intermittency: From Wind Farm Turbulence to Economic Management," (WINDINSPIRE). 2012-2017 (\$4.3M, C. Meneveau, JHU, Director; B. Hobbs, D. Gayme, S. Guikema, J. Cardell, et al., PIs).
- "Sustainable Energy Pathways: Integrating Heterogeneous Energy Resources for Sustainable Power Networks - A Systems Approach." 2012-2016 (\$1.6M, D. Gayme, JHU, Director; B. Hobbs, C. Meneveau, JHU, CoPIs; A. Chakkraborty, NCSU, CoPI).
- "Collaborative Implementation Strategy for Sediment Reduction for the Greater Blue Earth River Basin" (CISSR-Blue Earth). 2012-2015, Funded by Minnesota Pollution Control Agency. (\$770K, PIs: P. Belmont (USU), J. Marr (UMinnesota), K. Gran (UMinn Duluth), P. Wilcock, B. Hobbs (JHU)), 2012-2015
- "Transmission Investment Assessment Under Uncertainty Using a Multi-Stage Stochastic Model Approach with Recourse", US Department of Energy, Consortium for Electricity Reliability Technology Solutions, 3/2011-12/2015.
- "System Dynamics Analysis of Obesity", NIH, 12/2010 (PI: Y. Wang, JHU School of Public Health/U Buffalo).
- "Model-based Methods for Debiasing Individual Probability Assessments: Theory and Experiments", National Science Foundation (NSF), 3/2010-3/2013 (R. Clemen, Duke University, and B.F. Hobbs, PIs).
- Graduate Research Supplement to EFRI RESIN, NSF, 9/2010-8/2013.
- "EFRI-RESIN: Development of Complex Systems Theories and Methods for Resilient and Sustainable Electric Power and Communications Infrastructures," NSF, 9/2008-8/2013 (B. Hobbs, PI of JHU Subcontract; Overall PI: L. Mili, Virginia Tech).
- "Analysis of Tradeoffs Implicit in a Set of IPM Runs", USEPA, 12/2007-7/2009.
- "Power System Responses to Complex Environmental Policy and Incentives Under Restructuring: Models and Analyses of Policy Interactions, Effectiveness, and Efficiency," NSF, 9/2006-8/2010 (B. Hobbs, PI; C. Norman, co-PI)
- "Study of Economic and Energy Impacts of Maryland Participation in the Northeastern Regional Greenhouse Gas Initiative," Maryland Department of the Environment, 6/2006-6/2008.
- "Economic and Multicriteria Analysis of River Restoration Decisions," National Center for Earth Surface Dynamics (funded by NSF), University of Minnesota, 2005-2013 (C. Paola and E. Foufoula-Georgiou, Directors; B.F. Hobbs, PI).
- "Methodology for Assessing the Effects of Technological and Economic Changes on the Location, Timing and Ambient Air Quality Impacts of Power Sector Emissions," USEPA STAR Grant, 2005-2008 (H. Ellis, PI; B. Hobbs, D. Burtraw, K. Palmer, Co-PIs).
- "Analysis of Equilibrium Long-Run Prices in Multidimensional Capacity Markets," PJM, 6/04-9/06.

- “Development Of A Regional-Scale Model For The Management Of Multiple-Stressors In The Lake Erie Ecosystem,” USEPA STAR grant, Subcontract to CWRU (J.F. Koonce, CWRU PI; B.F. Hobbs, coPI), 2003-2006.
- “Active Load Management Under Retail Access,” Maryland Power Plant Research Program, 12/03-11/04.
- “Dynamic Game-Theoretic Models of Electric Power Markets and Their Vulnerability”, National Science Foundation (B.F. Hobbs PI; J.-S. Pang, J. Harrington, and T. Friesz, CoPIs), 7/1/02-6/30/05.
- “Analysis of Multipollutant Policies for the Electric Power Sector under Multiple Objectives: The Value of Policy Coordination Under Technological and Economic Uncertainties,” USEPA, Office of Atmospheric Programs, 8/02-8/03.
- “Implications of Climate Change for Regional Air Pollution, Health Effects and Energy Consumption Behavior,” USEPA STAR Grant, 2/01 – 2/04 (H. Ellis, PI; B. Hobbs, F. Joutz, J. Patz, Co-PIs).
- “Comprehensive Access to Off-Site Library Print Materials,” Sponsored by Mellon Foundation, 1/99-12/01 (S. Choudhury, PI; B. Hobbs, Co-PI).
- “Simulating Strategic Behavior in Multiple Power Markets by Complementarity and MPEC Methods; Energy, Capacity, Ancillary Services, Green Power and Emissions Allowance Markets,” NSF, 9/00 – 8/02 (J.-S. Pang, Co-PI).
- “An Analysis of Electric Power Capacity Markets,” Maryland Power Plant Research Program (MPPRP), 12/99 – 12/01.
- “The 1997 *Pfiesteria piscicida* Outbreak In Maryland: Possible Economic Impacts,” MPPRP, 1/99 – 6/00.
- “Multicriteria Evaluation of Lake Erie Ecosystem Management.” USEPA Region V, 9/98-12/00.
- “Distribution Capital Budgeting Evaluation System.” Baltimore Gas & Electric Corporation, 2/98-8/98.
- “Assessment of Fishery Resource Values Used for Damage Compensation in Maryland, and Economic Assessment of Acid Mine Drainage Abatement in the North Branch of the Potomac River Watershed: Application.” MPPRP, 11/96-6/00.
- “Modeling and Multiobjective Risk Decision Tools for Assessment and Management of Great Lakes Ecosystems.” USEPA, 9/96-10/00 (J.F. Koonce, Co-PI).
- “New Methods for Decision Focussed Integrated Assessment: Multiple Objectives, Risk Evaluation, and Visualization.” NSF, 9/96-9/98 (Co-PI; H. Ellis, PI).
- “Economic Assessment of Acid Loading Abatement in the North Branch of the Potomac River Watershed: Procedure and Demonstration.” MPPRP, 5/96-8/96.
- “Methods for Integrating Resource and Transmission Planning: Multiarea Production Costing and Resource/T&D Coordination.” NSF, 9/95-8/99.
- “The Value of Improved Short-Term Load Forecasts.” Electric Power Research Institute (EPRI), 9/95-12/97.
- “Development of a Method for Quantifying Benefits of Projects Addressing Environmental Issues,” Gas Research Institute, 1/95-2/96.
- “Multiarea Production Costing Methodology Development” and “Analyzing the Effect of NO<sub>x</sub> Constraints on Expected Production Cost,” EPRI, 1/94-12/94.
- “Climate Change Information and Great Lakes Management: Modeling, Worth of Flexibility, and Process Evaluation.” NSF and US Army Corps of Engineers, 4/93-3/96.
- “Improved Methods for Considering Environmental Externalities in Resource Acquisition: Multiple Criteria, Location-Specific Impacts, and Secondary Effects.” US Dept. of Energy Integrated Resource Planning Research Program, Oak Ridge National Laboratory, 9/92-3/94.
- “Enhancement of the ‘Most Value’ Criterion: Multicriteria Analysis.” Centerior Energy Corporation, 3/91-11/91.
- “Acid Rain Special Topic Information.” Ohio Consumers' Counsel, 8/90 - 6/91.
- “Comprehensive Emission Reduction Model.” Ohio Air Quality Development Authority (OAQDA), 5/89-7/90.
- “Integrated Resource Planning Assistance.” Centerior Energy Corporation, 8/89 - 6/90.



- Presidential Young Investigator, NSF, 5/86-5/91.
- "Analysis of Risks in Least Cost Planning." National Regulatory Research Institute, 4/88-12/88.
- "Multiobjective Screening of Water Resources Projects Under Risk." U.S. Army Corps of Engineers, 2/88-6/89.
- "Session on Natural Hazards." NSF, 1/88-1/89.
- "Development of a Multiobjective Evaluation System for Water Resources Planning." South Florida Water Management District, 11/88-6/1989.
- "Criteria for Evaluating Integrated Resource Planning Programs." Centerior Energy Corporation, 9/88-2/89.
- "Economic Criteria for Integrated Resource Planning." Centerior Energy Corporation, 9/87-1/88.
- "Regional Economic Impacts of Least Cost Planning and Proposed Acid Rain Legislation." Ameritech Fellowship from the Center for Regional Economic Issues, Case Western Reserve University, 9/87-6/90.
- "Least Emissions Dispatching: Cost and Employment Impact Analysis." OAQDA, 6/87-6/88.
- "Water Resources Issues Management." EPRI, 4/87-12/87.
- "Identification of Least Cost Planning Issues for the Centerior Energy Corporation." Centerior Energy Corporation, 10/87-3/88.
- "Impact of Precipitation Interruption upon Water Supplies." Federal Emergency Management Administration (through Oak Ridge National Lab.), 2/87-10/87.
- "Project Management Assistance, Aircraft Deployment Analysis System Project." U.S. Military Airlift Command (through ORNL), 10/86-8/87.
- "Monte Carlo Simulation of Energy Investments." Standard Oil Company, 10/86-10/87.
- "Risk-Benefit Analysis of Annular Disposal of Oil and Gas Brines." U.S. Geological Survey, Ohio Water Resources Center, 7/85 - 6/87.

## PUBLICATIONS

Citations: [scholar.google.com/citations?user=3oKvgGcAAAAJ&hl=en](https://scholar.google.com/citations?user=3oKvgGcAAAAJ&hl=en)

### Books

S.A. Gabriel, A.J. Conejo, J.D. Fuller, B.F. Hobbs, and C. Ruiz, *Complementarity Modeling in Energy Markets*, Springer-Verlag, International Series in Operations Research and Management Science, Heidelberg/Dordrecht/London, 2012, 629 pp.

Committee on Changes in New Source Review Programs for Stationary Sources of Air Pollutants, *New Source Review for Stationary Sources of Air Pollution*, National Academies Press, Washington, DC, 2006.

B.F. Hobbs and P. Meier, *Energy Decisions & The Environment: A Guide to the Use of Multicriteria Methods*, International Series in Operations Research & Management Science, Kluwer Academic Publishers, Boston/Dordrecht/London, 2000, 257 pp.

B.F. Hobbs, M.H. Rothkopf, R.P. O'Neill, and H.-p. Chao, eds., *The Next Generation of Electric Power Unit Commitment Models*, International Series in Operations Research & Management Science, Kluwer Academic Publishers, Boston/Dordrecht/ London, 2001, 319 pp.

### Edited Proceedings and Special Issues

B.F. Hobbs, ed., *Energy in the 90's*, Specialty Conference of the Energy Division, American Society of Civil Engineers, New York, NY, April 1991.

A. Conejo and B.F. Hobbs, eds., “Foreword to the Special Issue on Transmission Investment, Pricing, and Construction”, IEEE Transactions on Power Systems, 22(4), Nov. 2007

B.F. Hobbs and E. Litvinov, eds., “Foreword to the Special Section on Electricity Market Operations,” IEEE Transactions on Power Systems, Jan. 2014

Y. Ding, C. Kang, J. Wang, Y. Chen and B.F. Hobbs. Eds., “Foreword to the Special Section on Power System Planning and Operation towards a Low-Carbon Economy,” IEEE Transactions on Power Systems, 30(2), March, 2015, 1015-1016.

## Journal Articles

- E. Spyrou, J. Ho, B.F. Hobbs, R. Johnson, and J.D. McCalley, What are the Benefits of Co-optimizing Transmission and Generation Investment? Eastern Interconnection Case Study, IEEE Transactions on Power Systems, accepted.
- C. Bothwell and B.F. Hobbs, Crediting Renewables in Electricity Capacity Markets: The Effects of Alternative Definitions upon Market Efficiency, The Energy Journal, accepted.
- G. Morales-Espana, L. Ramírez-Elizondo, and B.F. Hobbs, and Hidden Power System Inflexibilities Imposed by Traditional Unit Commitment Formulations, Applied Energy, 191(1), April 2017, 223–238, 10.1016/j.apenergy.2017.01.089.
- H. Xing, Z. Lin, M. Fu, and B.F. Hobbs, Distributed Algorithm for Dynamic Economic Power Dispatch with Energy Storage in Smart Grids, IET Transactions on Control Theory and Applications, accepted.
- K. van den Burgh, R. Broder-Hytowitz, K. Bruninx, E. Delarue, W. D'haeseleer, and B.F. Hobbs, "Benefits of coordinating sizing, allocation and activation of reserves among market zones," Electric Power Systems Research, 143: 140–148, Feb. 2017.
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