

Seth Blumsack

Assistant Professor of Energy and Mineral Engineering, The Pennsylvania State University
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Research Interests

- Energy, environmental and electric power systems
- Small-scale electric power production
- Network industries
- Antitrust and the measurement of market power
- Network and graph theory
- Complex systems and network reliability
- Congestion pricing and management
- Regulation, deregulation, and commoditization
- Real options approaches to infrastructure management and investment

Professional History

The Pennsylvania State University – Assistant Professor, Department of Energy and Mineral Engineering, June 2007 – present. Teaching responsibilities include undergraduate courses in the Energy Business and Finance program, as well as the Department’s graduate program in Energy Management and Policy. Research focuses on engineering-economic studies of network industries, with a focus on energy systems. Current projects include studying investment in high-voltage transmission infrastructure, identification of “critical infrastructure” for electric-network reliability, building-integrated and small-scale energy systems, and transitioning to low-emissions power and transport systems.

Carnegie Mellon University – Postdoctoral Research Fellow, Carnegie Mellon Electricity Industry Center, Tepper School of Business, May 2006 – 2007.

Carnegie Mellon University – Ph.D. Candidate, Department of Engineering and Public Policy, August 2003 – May 2006. Graduate research position with the Carnegie Mellon Electricity Industry Center.

Economic Insight, Inc. – Economist, writer, and editor, June 1998 – June 2001. Performed economic analysis to support the firm’s senior consultants for a variety of public and private clients in the energy and electric power sectors. Contributing editor for the *Energy Market Report*, a daily newsletter covering North American wholesale electricity markets. Editor of *Pacific West Oil Data*, a monthly compendium of data and information concerning the crude-oil and petroleum products industry in the Western U.S. and Pacific Rim.

Oregon Department of Fish and Wildlife – Summer intern, May – August 1997. Researched social, economic, and climactic determinants of the demand for coastal salmon fishing.

Publications and Research

Journals, Books, and Refereed Conference Proceedings

Blumsack, Seth, Lester B. Lave and Jay Apt, 2009. "Prices and Costs for Electric Utilities Under Regulation and Restructuring," currently under review at *American Economic Review*.

Blumsack, Seth, Paul Hines, Mahendra Patel, Clayton Barrows and Eduardo Cotilla Sanchez, 2009. "Network Partitioning for Reliability Assessments," currently under review at *IEEE Transactions on Power Systems*

Blumsack, Seth, 2009. "Electric Rate Design and Emissions Reductions," *Papers and Proceedings of the IEEE Power Engineering Society*, Calgary AB, July.

Blumsack, Seth, Paul Hines, Mahendra Patel, Clayton Barrows and Eduardo Cotilla Sanchez, 2009. "Defining Power Network Zones with Measures of Electrical Distance," *Papers and Proceedings of the IEEE Power Engineering Society*, Calgary AB, July.

Brownson, Jeffrey, Seth Blumsack and Jeff Rayl, 2009. "Matching Photovoltaic Orientation to Energy Loads," *Proceedings of the ASES National Solar Conference*, Buffalo NY, May.

Blumsack, Seth, Jeffrey Brownson and Lucas Witmer, 2009. "Economic and Environmental Performance of Ground-Source Heat Pumps in Central Pennsylvania," *Proceedings of the 42nd Hawaii International Conference on System Sciences*, Waikoloa HI, January.

Walawalkar, Rahul, Seth Blumsack, Jay Apt and Stephen Fernands, 2008. "Analyzing PJM's Economic Demand Response Program," *Energy Policy* 36:10, pp. 3692 - 3702.

Blumsack, Seth, Lester B. Lave and Marija Ilic, 2008. "The Real Problem with Merchant Transmission," *Electricity Journal* 21:2, pp. 9 – 19.

Blumsack, Seth, Constantine Samaras and Paul Hines, 2008. "Long-Run Electric System Investments to Support Low-Emissions Plug-in Electric Hybrid Vehicles," to appear in *Papers and Proceedings of the IEEE Power Engineering Society*, Pittsburgh PA, July.

Newcomer, Adam, Seth Blumsack, Jay Apt, Lester B. Lave and M. Granger Morgan, 2008. "The Short Run Economic and Environmental Effects of a Carbon Tax on U.S. Electric Generation," *Environmental Science and Technology* 42:9, pp. 3139 – 3144.

Blumsack, Seth and Dmitri Perekhodtsev, 2008 (forthcoming). "Retail Competition in Electricity," in the *International Handbook of Energy Economics*, L. Hunt and J. Evans, eds., Edward Elgar Publishing, London.

Perekhodtsev, Dmitri and Seth Blumsack, 2008 (forthcoming). "International Wholesale Markets for Electricity," in the *International Handbook of Energy Economics*, L. Hunt and J. Evans, eds., Edward Elgar Publishing, London.

Hines, Paul and Seth Blumsack, 2008. "A Centrality Measure for Electrical Networks," *Proceedings of the 41st Hawaii International Conference on System Sciences*, Waikoloa HI, January.

Lave, Lester B., Jay Apt and Seth Blumsack, 2007. "Deregulation/Restructuring, Part I: Re-regulation Will Not Fix the Problems," *Electricity Journal* 20:8, pp. 9 – 22.

Lave, Lester B., Jay Apt and Seth Blumsack, 2007. "Deregulation/Restructuring, Part II: Where Do We Go From Here?" *Electricity Journal* 20:9, pp. 10 – 23.

Blumsack, Seth, Lester B. Lave, and Marija Ilic, 2007. "A Quantitative Analysis of the Relationship Between Congestion and Reliability in Electric Power Networks," *Energy Journal* 28:4, pp. 73 – 100.

Blumsack, Seth, 2007. "Measuring the Benefits and Costs of Regional Electric Grid Integration," *Energy Law Journal* 28:1, pp. 147 – 184.

Blumsack, Seth, Marija Ilic and Lester B. Lave, 2007. "Decomposing Congestion and Reliability," under revision for *IEEE Transactions on Power Systems*.

Lave, Lester B., Seth Blumsack, Dalia Patiño-Echeverri, Eric Hsieh and Marija Ilic, 2007. "Regulators as Decision Makers," *Engineering Electricity Services of the Future*, Kluwer Academic Publishing (forthcoming).

Ilic, Marija, Seth Blumsack, Slobodan Pajic, Le Xie, Yong Tae Yoon and Chien-Ning Yu, 2007. "Regional Transmission Organizations as Decision Makers," *Engineering Electricity Services of the Future*, Kluwer Academic Publishing (forthcoming).

Blumsack, Seth, Damien Ernst, Edo Macan, Anna Minoia, Jean-Pierre Leotard, Anupam Thatte, Yong Tae Yoon, Chien-Ning Yu and Marija Ilic, 2007. "Transmission Owners as Decision Makers," *Engineering Electricity Services of the Future*, Kluwer Academic Publishing (forthcoming).

Blumsack, Seth, Lester B. Lave, and Marija Ilic, 2006. "Assessing the Tradeoffs Between Congestion and Reliability in Electric Power Networks," *Papers and Proceedings of the 26th North American Conference, U.S. Association for Energy Economics*, September, Ypsilanti, MI.

Blumsack, Seth, Jay Apt, and Lester Lave, 2006: "Lessons From the Failure of U.S. Electricity Restructuring," *The Electricity Journal*, 19:2, pp. 15 – 32. Also translated into Japanese by the Japan Electric Power Information Center.

Blumsack, Seth, Jay Apt, and Lester Lave, 2005: "A Cautionary Tale: U.S. Electric Sector Reform," *Economic and Political Weekly*, 40:50, pp. 5279 – 5301.

Blumsack, Seth (2005): "Some Implications of the Braess Paradox for Pricing and Investment in Electric Power Systems", *Proceedings of the MIT Technology, Policy, and Management Consortium*, Cambridge MA, June.

Lave, Lester B., Jay Apt and Seth Blumsack, 2004: "Rethinking Electricity Deregulation", *The Electricity Journal*, Vol. 17, No. 8, pp 11 – 26.

Blumsack, Seth and Lester B. Lave, 2004: “Mitigating Market Power in Restructured U.S. Electricity Markets”, *Papers and Proceedings of the 24th North American Conference, U.S. Association for Energy Economics*, July, Washington, D.C.

Blumsack, Seth, Dmitri Perekhodtsev and Lester Lave, 2002: “Market Power in Deregulated Wholesale Electricity Markets: Issues in Measurement and the Cost of Mitigation”, *The Electricity Journal*, Vol. 15, No.9, pp 1-24.

Van Vactor, Samuel and Seth Blumsack, 2002: “How to Make Power Markets Competitive,” in *Electricity Pricing in Transition*, Ahmad Faruqui and Kelly Eakin, eds., Kluwer Academic Publishing.

White Papers, Expert Testimony and Technical Reports to Sponsors

Blumsack, Seth, Paulina Jaramillo, W. Michael Griffin and H. Scott Matthews, 2009. “A Life-Cycle Greenhouse Gas Inventory for Pennsylvania’s Electric Generation Sector,” report to the Pennsylvania Department of Environmental Protection.

Shortle, James, David Abler, Seth Blumsack, Robert Crane, Zachary Kauffman, Marc McDill, Ray Najjar, Richard Ready, Denice Wardrop and Thorsten Wagener, 2009. “Pennsylvania’s Climate Futures,” report to the Pennsylvania Department of Environmental Protection.

Blumsack, Seth, 2009. Affidavit submitted on behalf of the Connecticut Department of Public Utility Control in FERC Docket ER09-1144-000, concerning ISO New England’s Forward Capacity Market.

Blumsack, Seth, Paul Hines, Clayton Barrows and Eduardo Cotilla Sanchez, 2008. “Network Clustering for Load Deliverability Assessments in PJM,” for the PJM Interconnection, LLC.

Blumsack, Seth, 2008. Affidavit submitted on behalf of the Maryland Public Service Commission in FERC Docket EL08-47-000, concerning PJM’s Three Pivotal Supplier Test for market power.

Blumsack, Seth, 2007. “Transmission Modeling in WinDS,” NREL Report number AEU-7-77273-01.

Apt, Jay, Seth Blumsack and Lester B. Lave, 2007. *Competitive Energy Options for Pennsylvania*, report prepared for the Team Pennsylvania Foundation. Available online at: http://wpweb2.tepper.cmu.edu/ceic/papers/Competitive_Energy_Options_for_Pennsylvania.htm

Morgan, G., J. Apt, L. Lave, J. Bergerson, S. Blumsack, J. DeCarolis, P. Hines, D. King, D. Patiño-Echeverri, and H. Zerriffi, 2005. “The U.S. Electric Power Sector and Climate Change Mitigation,” for the Pew Center on Global Climate Change.

Blumsack, S., S. van Vactor, and P. Stiffler, 2000. “Outlook for Gasoline and Distillates,” report prepared for the Oregon Department of Energy.

Working Papers

Brownson, Jeffrey, Seth Blumsack and Jeff Rayl, 2009. "Optimal Azimuth and Angles for Grid-tied Building-Integrated Photovoltaics," in preparation for submission to *Environmental Science and Technology*

Blumsack, Seth, Jeffrey Brownson and Lucas Witmer, 2009. "Economies of Scale and Scope in Residential Building Insulation and Energy Efficiency," in preparation for submission to *Energy Policy*.

Blumsack, Seth, Lester B. Lave and Jay Apt, 2008. "Prices and Costs for Electric Utilities Under Regulation and Restructuring," CEIC Working Paper 08-03.

Blumsack, Seth and Marija Ilic, 2006. "Some Implications of Braess' Paradox for Electric Power Systems."

Blumsack, Seth, Marija Ilic, and Lester B. Lave, 2006. "Decomposing Congestion and Reliability."

Blumsack, Seth, 2006. "Network Decomposition via Graph Theory and Watts-Strogatz Clustering."

Blumsack, Seth, Lester B. Lave, and Marija Ilic, 2006. "Topological Elements of Transmission Pricing and Planning," CEIC Working Paper 06-08.

Blumsack, Seth, Lester B. Lave, and Marija Ilic, 2006. "A Quantitative Analysis of the Relationship Between Congestion and Reliability in Electric Power Networks," CEIC Working Paper 06-09.

Blumsack, Seth, 2006: "Network Topologies and Transmission Investment Under Electric Industry Restructuring," unpublished Ph.D. dissertation, Carnegie Mellon University. The dissertation committee consisted of Lester Lave (chair), Marija Ilic, Sarosh Talukdar, and Jay Apt.

Blumsack, Seth, 2006: "The Economic Efficiency of Point-to-Point Financial Transmission Rights is Limited by the Network Topology."

Perekhodtsev, Dmitri, Lester Lave, and Seth Blumsack (2002): "A Model of Pivotal Oligopoly for Electricity Markets."

Teaching

Penn State University – Introduction to Energy and Earth Sciences Economics (ENNEC 100, Fall 2007 and 2008), Environmental Management for the Energy and Earth Minerals Industries (EM SC 304, Spring 2008), Theory and Practice of Policy Analysis for Engineers (EGEE 597A, Spring 2008), Energy and Modern Society (EM SC 420, Fall 2008).

Carnegie Mellon University – The Transformation of Energy Markets (Cross-listed in Economics and Engineering, Spring 2005)

Education

Carnegie Mellon University – Ph.D., Engineering and Public Policy, May 2006. Dissertation title:

Network Topologies and Transmission Investment Under Electric Industry Restructuring.

Carnegie Mellon University – M.S., Economics, May 2003.

Reed College – B.A., Mathematics and Economics, May 1998.

Awards and Honors

William W. Cooper Doctoral Dissertation Award for “Outstanding Doctoral Dissertation in Management or the Management Sciences,” Tepper School of Business, Carnegie Mellon University, May 2006.

Best Poster Award for “Some Implications of Braess’s Paradox for Electric Power Networks,” Technology, Policy and Management Consortium, Cambridge MA, May 2005.

Herbert L. Toor Award for “Outstanding Research Paper Submitted in the Qualifying Examinations of the Department of Engineering and Public Policy,” Carnegie Mellon University, February 2004.

DEED Technical Grant for “Reducing Peak Demand in Public Power Systems,” American Public Power Association, December 2001.

William Larimer Mellon Scholarship, Graduate School of Industrial Administration, Carnegie Mellon University, Academic years 2001 through 2003.

Professional Memberships and Activities

Member, U.S. Association for Energy Economics

Member, Power Engineering Society (PES) of the IEEE

Member, American Geophysical Union

Member, American Economic Association

Serve on the following PES subcommittees: System Economics, Transmission Planning, and Network Design

Serve on the organizing committee for the Electric Power Engineering and Economics track, Hawaii International Conference on System Sciences

Peer reviewer for the following journals: IEEE Transactions on Power Systems, IEEE Transactions on Power Delivery, Energy Journal, Environmental Science and Technology, Journal of Regulatory Economics

Consulting Activities

Connecticut Department of Public Utility Control, June 2009.

Maryland Public Service Commission, August – November 2008

American Public Power Association, February 2008 – February 2009

National Renewable Energy Laboratory, May – July 2007

Consortium for Risk Evaluation with Stakeholder Participation, December 2007