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Updated: December 2015

Table of Contents

| | |
|--|-----------|
| Research Interests | 2 |
| Education | 2 |
| Professional History | 2 |
| Research Publications | 4 |
| Peer-Reviewed Journals | 4 |
| Refereed Conference Papers..... | 7 |
| Book Chapters | 10 |
| White Papers, Expert Testimony and Technical Reports..... | 11 |
| Unpublished and Archived Working Papers | 12 |
| Invited Lectures, Conference Papers and Presentations | 13 |
| Teaching..... | 15 |
| Courses Developed and Taught at Penn State University | 15 |
| Courses Developed and Taught at Vermont Law School | 17 |
| Courses Developed and Taught at Carnegie-Mellon University | 17 |
| University and Professional Service Activities | 17 |
| University Service, Penn State University | 17 |
| Professional Service Activities | 18 |
| Awards and Honors..... | 18 |
| Consulting and Advisory Activities | 19 |
| Graduate Students Advised | 19 |

| | |
|--|-----------|
| Current M.S. and Ph.D. Advising in the Energy and Mineral Engineering Department | 19 |
| Past M.S. and Ph.D. Advising in the Energy and Mineral Engineering Department (students listed in alphabetical order)..... | 20 |
| External M.S. and Ph.D. Advising | 20 |
| Undergraduate Honors Advising | 21 |
| Grant and Contract Funding | 21 |
| Current Grant and Contract Funding | 21 |
| Past Grant and Contract Funding | 24 |

Research Interests

- Energy, environmental and electric power systems
- Energy efficiency
- Community-scale energy systems
- Water and energy policy
- Infrastructure management and investment
- Network industries
- Antitrust and the measurement of market power
- Network science and graph theory
- Complex systems and network reliability
- Unconventional natural gas
- Congestion pricing and management
- Energy regulation, deregulation, and commoditization

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.

Professional History

The Pennsylvania State University – Assistant Professor, John and Willie Leone Family

Department of Energy and Mineral Engineering (EME), June 2007 – April 2013; Associate Professor, April 2013 – present; Chair of Energy Business and Finance, July 2015 – present.

Teaching has focused on developing interdisciplinary and problem-focused approaches to educating graduate and undergraduate students in energy business and energy systems engineering. Within EME, I teach undergraduate courses related to the electric utility industry; decision-making; environmental risk; and energy policy, as well as cross-cutting graduate courses in energy policy; electric power systems; and engineering design to students in all of EME’s graduate options. I have also developed resident and online delivery courses for

Geosciences, Aerospace Engineering and Architectural Engineering at Penn State. Online course activity has included one of Penn State's first MOOCs (co-authored with Richard Alley), focused on energy and climate change. Research focuses on coupled physical, engineered and social systems, with a focus on energy, the environment and electric power. Research projects have included building planning and operational models for coupled electricity and natural gas infrastructure; modeling the evolution of regional electric power grids; analysis of pricing and technology for electricity consumers in Vermont; utilization of unconventional and "stranded" natural gas; electric transmission planning, investment and optimization; predictive control of large-scale power grids to promote localized air quality improvements; project evaluation for sequestration of industrial carbon in shales; the market for combined heat and power systems; studying design and construction of energy-efficient buildings; analysis of the performance of large-scale academic research projects; design and management of electric power micro-grids; environmental risk and economic impacts of unconventional natural gas development; identification of "critical infrastructure" for electric-network reliability; building-integrated and small-scale energy systems; risk and economic assessments of geologic carbon sequestration; and transitioning to low-emissions power and transportation systems.

Boise State University – Collaborating faculty and external advisor, Energy Policy Institute and Center for Advanced Energy Studies, August 2011 – present.

The Pennsylvania State University – Faculty member, Operations Research dual-degree graduate program, January 2010 – present.

Technical University of Curtin (Australia) – Collaborator, Centre for Research in Energy and Mineral Economics, September 2009 – present.

Carnegie Mellon University – Adjunct Research Professor, Carnegie Mellon Electricity Industry Center, September 2007 - present.

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.

Research Publications

Peer-Reviewed Journals

Student co-authors are marked with an asterisk ()*

1. Shahriari, Mehdi* and Seth Blumsack, "Scaling of Wind Energy Variability Over Space and Time," under review, *Nature Energy*, submitted December 2015.
2. Shahriari, Mehdi* and Seth Blumsack, "A Sharpe Ratio for Wind Energy Portfolios," under review, *IEEE Transactions on Power Systems*, submitted December 2015.
3. Hines, Paul, Seth Blumsack and Markus Schlapfer, "Centralized vs Decentralized Infrastructure Networks," under second review, *IEEE Transactions on Smart Grids*, submitted September 2015.
4. Sahraei-Ardakani, Mostafa and Seth Blumsack, "Transfer Capability Improvement through Market-Based Operation of Series FACTS Devices," forthcoming, *IEEE Transactions on Power Systems*, accepted December 2015.
5. Tayari, Farid, Seth Blumsack, Bob Dilmore, Shahab Mohaghegh, 2015. "Techno-Economic Assessment of Industrial CO₂ Storage in Depleted Shale Gas Reservoirs," *Journal of Unconventional Oil and Gas Resources* 11, pp. 82-94.
6. Kumpf, Katrina*, Seth Blumsack, George Young and Jeffrey Brownson, 2015. "Portfolio analysis of solar photovoltaics: Quantifying the contributions of locational marginal pricing and power on revenue variability," *Solar Energy* 119, pp. 277-285.
7. Sahraei-Ardakani, Mostafa, Seth Blumsack and Andrew Kleit, 2015. "Estimating Zonal Supply Curves in Transmission-Constrained Electricity Markets," *Energy* 80:1, pp. 10-19.
8. Govindarajan, Anand* and Seth Blumsack, 2015. "Equilibrium Deployment of Combined Heat and Power," *Journal of Energy Engineering* 04015045, doi: 10.1061/(ASCE)EY.1943-7897.0000306
9. Blumsack, Seth, 2014, "Dash for Gas, 21st Century Style," *Elements* 10:4, pp. 265-270.
10. Shcherbakova, Anastasia, Andrew Kleit, Seth Blumsack, Joohyun Cho* and Woonam Lee, 2014. "Effect of Increased Wind Penetration on System Prices in Korea's Electricity Markets," *Wind Energy* 17:10, pp. 1469-1482.
11. Fernandez, Alisha*, Seth Blumsack and Patrick Reed, 2013. "Operational Constraints and Hydrologic Variability Can Limit Hydropower in Supporting Wind Integration," *Environmental Research Letters* 8 024037; doi: 10.1088/1748-9326/8/2/024037.
12. Shcherbakova, Anastasia, Andrew Kleit, Seth Blumsack, Joohyun Cho* and Woonam Lee, "Effect of Wind Energy on Electricity Market Prices in South Korea," forthcoming, *Wind Energy*, accepted May 2013.
13. Cotilla Sanchez, Eduardo, Paul Hines, Clayton Barrows* and Seth Blumsack, 2013. "Multi-Attribute Partitioning of Power Networks Using Electrical Distance," *IEEE Transactions on Power Systems* 28:4, pp. 4979-4987.

14. Ayala, Luis and Seth Blumsack, 2013. "The Braess Paradox and its Impacts on Natural Gas Network Performance," *Oil and Gas Facilities* 2:3.
15. Dowds, Jonathan*, Paul Hines and Seth Blumsack, 2013. "Estimating the impact of fuel-switching between liquid fuels and electricity under electricity-sector carbon-pricing schemes," *Socio-Economic Planning Sciences* 47:2, pp. 76-88; DOI: 10.1016/j.seps.2012.09.004.
16. Blumsack, Seth, David Yoxtheimer, and Tom Murphy, 2012. "The Decision to Utilize Acidic Mine Discharge in Hydraulic Fracturing Applications," *Environmental Practice* 14:4, pp. 301-307.
17. Barrows, Clayton*, Seth Blumsack and Russell Bent, "Towards Tractable Optimal Transmission Switching: Solution Space Reduction," under review, *IEEE Transactions on Power Systems*, submitted August 2012.
18. Kern, Jordan*, Greg Characklis, Martin Doyle, Seth Blumsack and Richard Wishunt, 2012. "The Influence of De-Regulated Electricity Markets on Hydropower Generation and Downstream Flow Regime," *Journal of Water Resources Planning and Management* 138:4, pp. 342-355. DOI: 10.1061/(ASCE)WR.1943-5452.0000183
19. Blumsack, Seth and Kelsey Richardson*, 2012. "Cost and Emissions Implications of Coupling Wind and Solar Power," *Smart Grids and Renewable Energy*, 3:4, pp. 308-315.
20. Sahraei-Ardakani, Mostafa*, Seth Blumsack and Andrew Kleit, 2012. "Distributional Impacts of State-Level Energy Efficiency Policies," in press, *Energy Policy*. DOI: 10.1016/j.enpol.2012.06.034
21. Li Li, Evan Frye* and Seth Blumsack, 2012. "Environmental Controls of Cadmium Desorption During CO₂ Leakage," *Environmental Science and Technology* 46, pp. 4388-4395. DOI: 10.1021/es3005199.
22. Barrows, Clayton* and Seth Blumsack, 2012. "Transmission Switching in the IEEE RTS-96 Test System," *IEEE Transactions on Power Systems* 27:2, pp. 1134-1135. DOI: 10.1109/TPWRS.2011.2170771.
23. Hines, Paul, Seth Blumsack, Eduardo Cotilla-Sanchez* and Clayton Barrows*. "Comparing the Topological and Electrical Structure of the North American Electric Power Infrastructure," in press, *IEEE Systems Journal*, accepted February 2012. DOI: 10.1109/JSYST.2012.2183033.
24. Blumsack, Seth, and Alisha Fernandez,* 2012. "Ready or Not, Here Comes the Smart Grid," *Energy* 37:1, pp. 61-68. DOI: 10.1016/j.energy.2011.07.054
25. Fernandez, Alisha*, Seth Blumsack and Patrick Reed, 2012. "Evaluating Wind-Following and Ecosystem Services for Hydroelectric Dams," *Journal of Regulatory Economics* 41:1, pp. 139-154. DOI: 10.1007/s11149-011-9177-9.
26. Seth Blumsack, Andrew Kleit and Stephon Smith*, 2012. "Evaluation of State and Federal Subsidies for Ground-Source Heat Pumps," *Energy Efficiency* 5:3, pp. 321-334. DOI: 10.1007/s12053-012-9144-z.

27. Blumsack, Seth and Jianhua Xu, 2011. "Spatial Variation of Emissions Impacts due to Renewable Energy Siting Decisions in the Western U.S. Under High-Renewable Penetration Scenarios" *Energy Policy* 39:11, pp. 6962-6971. DOI: 10.1016/j.enpol.2010.11.047.
28. Blumsack, Seth, 2010. "How Free Markets Rocked the Grid," *IEEE Spectrum* 47:12, 5 pages.
29. Iulo, Lisa, Seth Blumsack, Jeffrey Brownson and R. Allen Kimel, 2010. "Renewable Energy in the Planned World," *Interdisciplinary Themes Journal* 2:1, pp. 54-69.
30. Hines, Paul, Eduardo Cotilla-Sanchez* and Seth Blumsack, 2010. "Comparing Three Models of Attack and Failure Tolerance in Electric Power Networks," *Chaos: An Interdisciplinary Journal of Nonlinear Science* 20:3. DOI: 10.1063/1.3489887.
31. Walawalkar, Rahul*, Seth Blumsack, Jay Apt and Stephen Fernands, 2008. "Analyzing PJM's Economic Demand Response Program," *Energy Policy*, 36, pp. 3692-3702. DOI: 10.1016/j.enpol.2008.06.036.
32. Blumsack, Seth, Lester B. Lave and Marija Ilic, 2008. "The Real Problem with Merchant Transmission," *Electricity Journal* 21:2, pp. 9 – 19.
33. Newcomer, Adam*, Seth Blumsack, Jay Apt, Lester B. Lave and M. Granger Morgan, 2008. "Short Run Effects of a Price on Carbon Dioxide Emissions from U.S. Electric Generators," *Environmental Science and Technology* 42:9, pp. 3139 – 3144. DOI: 10.1021/es071749d.
34. 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.
35. 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.
36. 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.
37. Blumsack, Seth, 2007. "Measuring the Benefits and Costs of Regional Electric Grid Integration," *Energy Law Journal* 28:1, pp. 147 – 184.
38. 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.
39. 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.
40. Lave, Lester B., Jay Apt and Seth Blumsack, 2004: "Rethinking Electricity Deregulation", *The Electricity Journal*, Vol. 17, No. 8, pp 11 – 26.

41. 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.

Refereed Conference Papers

Student co-authors are marked with an asterisk ()*

42. Borraz-Sanchez, Conrado, Russell Bent, Scott Backhaus, Seth Blumsack and Pascal van Hentenryck, 2016. "Convex Optimization of Joint Natural Gas and Electric Power Planning," *Proceedings of the 49th Hawaii International Conference on System Sciences*, Poipu, HI, January 2016.
43. Blumsack, Seth, 2015. "Portfolio Analysis of Variable Renewable Power Generation," *INFORMS Annual Meeting*, Philadelphia PA, November 2015.
44. Shahriari, Mehdi* and Seth Blumsack, 2015. "Portfolio Analysis of Renewable Energies," *US Association of Energy Economics Annual Conference*, Pittsburgh PA, October 2015.
45. Blumsack, Seth, 2015. "The Energy Business and Finance Program at Penn State," *US Association of Energy Economics Annual Conference*, Pittsburgh PA, October 2015.
46. Blumsack, Seth and Anand Govindarajan,* 2015. "Blackout Risk Reduction Using Combined Heat and Power," *US Association of Energy Economics Annual Conference*, Pittsburgh PA, October 2015.
47. Blumsack, Seth and Anand Govindarajan,* 2015. "Private and Social Costs of Blackout Risk Reduction Using Combined Heat and Power," *Energy Policy Research Conference*, Denver CO, September 2015.
48. Ositelu, Oladipu* and Seth Blumsack, 2015. "The Response of Investors to Blackouts," *Proceedings of the 48th Hawaii International Conference on System Sciences*, Poipu, HI, January 2015.
49. Blumsack, Seth and Nicholas Johnson,* 2014. "Formal and Informal Decision Mechanisms in Regional Transmission Organizations," *Assoc. Public Policy and Management Annual Research Conference*, Albuquerque NM, November 2014.
50. Stafford, Benjamin, Elizabeth Wilson and Seth Blumsack 2014. "The Social Side of Electrons," *Assoc. Public Policy and Management Annual Research Conference*, Albuquerque NM, November 2014.
51. Couzo, Evan, Jason West, William Vizuete, Nicholas Johnson, Seth Blumsack, and Clayton Barrows, 2014. "Dynamically controlling daily power plant emissions to avoid ozone exceedances by coordinating air quality forecasts with electricity dispatch models," *Community Modeling and Analysis Systems*, Boston MA, July 2014.
52. Gautam, Suman* and Seth Blumsack, 2014, "Consumer Response to Peak Electricity Pricing in Vermont: The Green Mountain Power Experience," *IAEE Annual Meeting*, New York NY, June 2014.

53. Blumsack, Seth and Nicholas Johnson,* 2014, “Why Transmission Planning Reform Failed in the Mid-Atlantic but Succeeded in the Midwest,” *Industry Studies Association Annual Meeting*, Portland OR, May 2014.
54. Seth Blumsack, 2014. “Smart Grid Technology Development and Workforce Training,” *IEEE Transmission and Distribution Conference*, Chicago IL, April 2014.
55. Gautam, Suman* and Seth Blumsack, 2014, “Consumer Response to Critical Peak Electricity Pricing,” *American Economic Association Annual Meeting*, Boston MA, January 2014.
56. Govindarajan, Anand* and Seth Blumsack, 2013, “Equilibrium Deployment of Combined Heat and Power,” *USAEE North American Meeting*, Anchorage AK, July 2013.
57. Tayari, Farid*, Seth Blumsack and R.J. Briggs, 2013, “Sequestration of Industrial Carbon in Shales,” *USAEE North American Meeting*, Anchorage AK, July 2013.
58. Sahraei-Ardakani, Mostafa and Seth Blumsack, 2013, “Market Design for Dispatchable Electric Transmission,” *IEEE Power and Energy Society General Meeting*, Vancouver, BC (Canada), July 2013.
59. Blumsack, Seth and Mostafa Sahraei-Ardakani*, 2013. “Estimating Supply Curves in Transmission Constrained Electricity Markets” *CRRRI Eastern Conference on Regulation and Competition*, May 2013, Shawnee PA.
60. Tayari, Farid*, Seth Blumsack and R.J. Briggs, 2013, “Economic Analysis of Industrial Carbon Sequestration in Shales,” *Pittsburgh Conference on Carbon Capture, Sequestration and Utilization*, Pittsburgh PA, May 2013.
61. Fernandez, Alisha*, Seth Blumsack and Patrick Reed, 2013, “Hydropower Assets Must Overcome Severe Hurdles to Flexibly Support Wind Integration,” *Environmental and Water Resources Institute (EWRI) Conference*, Cincinnati OH, May 2013.
62. Barrows, Clayton,* Seth Blumsack and Russell Bent, 2013. “Graph-Based Heuristics for Adaptive Electrical Networks,” *Proceedings of the 46th Hawaii International Conference on System Sciences*, Wailea, HI.
63. Blumsack, Seth, Eduardo Cotilla-Sanchez, Paul Hines and Clayton Barrows*, 2012. “Multi-Objective Partitioning for Electrical Networks,” *INFORMS Annual Meeting*, Phoenix AZ, October 2012.
64. Blumsack, Seth and Nicholas Johnson*, 2012. “Transmission Cost Allocation for Renewable Energy Projects,” *Western Energy Policy Conference*, Boise ID, August 2012.
65. Blumsack, Seth and David Yoxtheimer, 2012. “The Utilization of Coal Mine Drainage in Hydraulic Fracturing,” *Western Energy Policy Conference*, Boise ID, August 2012.
66. Ayala, Luis and Seth Blumsack, 2012. “Examining Braess’ Paradox in Natural Gas Network Optimization,” *Proceedings of the SPE Annual Meeting*, San Antonio TX, October 2012.

67. Barrows, Clayton* and Seth Blumsack, 2012. "Efficient Transmission Switching via Solution Space Reduction," *Proceedings of the IEEE Power and Energy Society Annual Meeting*, San Diego CA, July 2012.
68. Sahraei-Ardakani, Mostafa* and Seth Blumsack, 2012. "Strategic Dispatch of Flexible Transmission Assets in Complete Electricity Markets," *Proceedings of the IEEE Power and Energy Society Annual Meeting*, San Diego CA, July 2012.
69. Blumsack, Seth, Paul Hines and Jonathan Dowds*, 2012. "Fuel Switching Under Carbon Constraints," *International Association of Energy Economics Annual Meeting*, Perth, Australia, June 2012.
70. Blumsack, Seth, 2012. "Ready or Not, Here Comes the Smart Grid," *International Association of Energy Economics Annual Meeting*, Perth, Australia, June 2012.
71. Blumsack, Seth and Mostafa Sahraei-Ardakani*, 2012. "When is Transmission Not Transmission?" *CRRRI Eastern Conference on Regulation and Competition*, Shawnee PA.
72. Blumsack, Seth and Clayton Barrows*, 2011. "Rules Versus Optimization in Adaptive Electrical Networks," *SLAM Dynamical Systems Conference*, Snowbird UT.
73. Blumsack, Seth, Alisha Fernandez* and Patrick Reed, 2011. "The Opportunity Cost of Backing up Wind Energy," *CRRRI Eastern Conference on Regulation and Competition*, Skytop PA.
74. Iulo, Lisa, Rohan Haksar*, and Seth Blumsack, 2011. "Design Strategies for Community-Scale Renewable Energy Solutions," *Proceedings of the 27th International Conference on Passive and Low Energy Architecture PLEA 2011, Volume 1*, edited by Magali Bodart, Arnaud Evrard, Louvain-la-Neuve: Presses Universitaires de Louvain, pp. 621-626.
75. Hines, Paul, Eduardo Cotilla-Sanchez* and Seth Blumsack, 2010. "Two Methods of Vulnerability Assessment for Electric Power Systems," *Proceedings of the 44th Hawaii International Conference on System Sciences*, Kauai, HI.
76. Choudhary, Paras*, Seth Blumsack and George Young, 2010. "Variance Minimizing Site Selection for Interconnected Wind Farms," *Proceedings of the 44th Hawaii International Conference on System Sciences*, Kauai, HI.
77. Sahraei-Ardakani, Mostafa*, Seth Blumsack and Andrew Kleit, 2010. "Supply Curve Estimation for Congested Electric Transmission Grids," *Proceedings of the IEEE Power Engineering Society*, Minneapolis MN.
78. Hines, Paul, Seth Blumsack, Eduardo Cotilla-Sanchez* and Clayton Barrows*, 2010 "The Topological and Electrical Structure of Power Networks," *Proc. 43rd Hawaii Int. Conf. Sys. Sci.*, Kauai, HI.
79. Blumsack, Seth, Jeffrey R. S. Brownson and Jeff Rayl*, 2010. "Matching Photovoltaic Orientation to Energy Loads," *Proc. 43rd Hawaii Int. Conf. Sys. Sci.*, Kauai, HI.
80. Hines, Paul, Seth Blumsack, Eduardo Cotilla Sanchez* and Clayton Barrows*, 2010. "The Topological and Electrical Structure of Power Transmission Networks," *Proceedings of the 43rd Hawaii International Conference on System Sciences*, Kauai HI.

81. Blumsack, Seth, 2009. "Electric Rate Design and Emissions Reductions," *Papers and Proceedings of the IEEE Power Engineering Society*, Calgary AB, July.
82. Brownson, Jeffrey, Seth Blumsack and Jeff Rayl*, 2009. "Matching Photovoltaic Orientation to Energy Loads," *Proceedings of the ASES National Solar Conference*, Buffalo NY, May.
83. 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.
84. Blumsack, Seth, Constantine Samaras and Paul Hines, 2008. "Long-Run Electric System Investments to Support Low-Emissions Plug-in Electric Hybrid Vehicles," *Papers and Proceedings of the IEEE Power Engineering Society*, Pittsburgh PA, July.
85. 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.
86. 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.
87. 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.
88. 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.

Book Chapters

89. Blumsack, Seth and Dmitri Perehokdtsev, 2009. "Retail Competition in Electricity," in the *International Handbook of Energy Economics*, L. Hunt and J. Evans, eds., Edward Elgar Publishing, London.
90. Perehokdtsev, Dmitri and Seth Blumsack, 2009. "International Wholesale Markets for Electricity," in the *International Handbook of Energy Economics*, L. Hunt and J. Evans, eds., Edward Elgar Publishing, London.
91. 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).
92. 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).
93. 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).

94. 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

95. Shortle, James, Dave Abler, Seth Blumsack, Rob Crane, Karen Fisher-Vanden, Marc McDill, Ray Najjar, Rich Ready and Thorsten Wagner, 2014. “Climate Impact Assessment for Pennsylvania: 2014 update,” report for the Pennsylvania Department of Environmental Protection and the Governor’s Climate Action Committee.
96. Blumsack, Seth, Michael Arthur and Thomas Murphy, 2013. “Water Management in the Shale Energy Sector,” report for the U.S. Congressional Research Service.
97. Blumsack, Seth and Luis Ayala, 2012. “Design and Analysis of a Natural Gas Micro-Grid,” report for Ben Franklin Technology Partners of Central Pennsylvania.
98. Shortle, James, Dave Abler, Seth Blumsack, Rob Crane, Karen Fisher-Vanden, Marc McDill, Ray Najjar, Rich Ready and Thorsten Wagner, 2012. “Climate Impact Assessment for Pennsylvania: 2011 update,” report for the Pennsylvania Department of Environmental Protection and the Governor’s Climate Action Committee.
99. Considine, Timothy, Robert Watson and Seth Blumsack, 2011. “The Pennsylvania Marcellus Natural Gas Industry: Economic Impacts and Prospects,” report prepared for the Marcellus Shale Coalition.
100. Blumsack, Seth, “Economics of Wind Energy,” invited expert testimony before the Pennsylvania Senate Committee on Economic and Recreational Development, March 14, 2011.
101. Blumsack, Seth, 2010. Affidavit submitted on behalf of the Connecticut Department of Public Utility Control in FERC Docket ER10-787-000, concerning the use of market power screens in the ISO New England Forward Capacity Market.
102. Considine, Timothy, Robert Watson and Seth Blumsack, 2010. “The Economic Impacts of the Marcellus Shale Natural Gas Formation: An Update,” report prepared for the Marcellus Shale Coalition.
103. Kleit, Andrew, Seth Blumsack, Zhen Lei, Mostafa Sahraei-Ardakani, Lora Hutelmyer and Stephon Smith, 2010. “Electricity Prices in Rural Pennsylvania in the Post-Restructuring Era,” report to the Center for Rural Pennsylvania.
104. Shortle, James, Dave Abler, Seth Blumsack, Rob Crane, Karen Fisher-Vanden, Marc McDill, Ray Najjar, Rich Ready and Thorsten Wagner, 2009. “Climate Impact Assessment for Pennsylvania,” report for the Pennsylvania Department of Environmental Protection and the Governor’s Climate Action Committee.

105. Blumsack, Seth, 2009. Affidavit submitted on behalf of the Connecticut Department of Public Utility Control in FERC Docket ER09-1144-000, concerning the use of market power screens in the ISO New England Forward Capacity Market.
106. Blumsack, Seth, Paul Hines, Clayton Barrows and Eduardo Cotilla Sanchez, 2008. "Network Clustering for Load Deliverability Assessments in PJM," for the PJM Interconnection, LLC.
107. 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.
108. Blumsack, Seth, 2007. "Transmission Modeling in WinDS," NREL Report number AEU-7-77273-01.
109. 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
110. 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.
111. Blumsack, S., S. van Vactor, and P. Stiffler, 2000. "Outlook for Gasoline and Distillates," report prepared for the Oregon Department of Energy.

Unpublished and Archived Working Papers

112. Blumsack, Seth, Lester B. Lave and Jay Apt, 2008. "Prices and Costs for Electric Utilities Under Regulation and Restructuring," CEIC Working Paper 08-03.
113. Blumsack, Seth and Marija Ilic, 2006. "Some Implications of Braess' Paradox for Electric Power Systems."
114. Blumsack, Seth, Marija Ilic, and Lester B. Lave, 2006. "Decomposing Congestion and Reliability."
115. Blumsack, Seth, 2006. "Network Decomposition via Graph Theory and Watts-Strogatz Clustering."
116. Blumsack, Seth, Lester B. Lave, and Marija Ilic, 2006. "Topological Elements of Transmission Pricing and Planning," CEIC Working Paper 06-08.
117. 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.
118. Blumsack, Seth, 2006: "Network Topologies and Transmission Investment Under Electric Industry Restructuring," Ph.D. dissertation, Carnegie Mellon University. The dissertation committee consisted of Lester Lave (chair), Marija Ilic, Sarosh Talukdar, and Jay Apt.

119. Blumsack, Seth, 2006: “The Economic Efficiency of Point-to-Point Financial Transmission Rights is Limited by the Network Topology.”
120. Perekhodtsev, Dmitri, Lester Lave, and Seth Blumsack (2002): “A Model of Pivotal Oligopoly for Electricity Markets.”

Invited Lectures, Conference Papers and Presentations

121. Blumsack, Seth, 2015. “Planning for an Appalachian Natural Gas Value Chain,” *Natural Gas Utilization Conference*, Pittsburgh, PA, October 2015.
122. Blumsack, Seth, 2015. “Climate Change and Pennsylvania’s Energy Sector,” American Institute of Chemical Engineering, Hershey PA, October 2015.
123. Blumsack, Seth, 2015. “Are Power Grids Complex or Just Complicated,” George Mason University, May 2015.
124. Blumsack, Seth, 2015. “Asian Carp Invade the Power Grid,” Santa Fe Institute, February 2015.
125. Seth Blumsack, 2014. “Controllability of Electrical Networks,” *Workshop on Dynamics of and on Networks*, Santa Fe, NM, December 2014.
126. Blumsack, Seth, 2015. “Carrots, Sticks and Electricity Consumption,” Santa Fe Institute, October 2014.
127. Blumsack, Seth, 2014. “Energy Land Management Education at Penn State,” *PIOGA Annual Conference*, Pittsburgh PA, May 2014.
128. Blumsack, Seth, 2013. “Energy in Pennsylvania: Past, Present and Future,” invited address, Leadership Centre County, April 2013.
129. Blumsack, Seth, 2013. “Water Management in Shale Gas Operations,” invited seminar speaker, University of Calgary, April 2013.
130. Blumsack, Seth, 2013. “Enabling Adaptive Electrical Networks,” invited seminar speaker, University of Vermont, February 2013.
131. Blumsack, Seth, Eduardo Cotilla Sanchez, Paul Hines and Clayton Barrows, 2012, “Multi-Objective Partitioning of Electrical Networks,” INFORMS, Phoenix AZ, October 2012.
132. Blumsack, Seth, 2012. “Carrots, Sticks and Other Smart Tricks: Reducing Household Electricity Demand,” Penn State Behavioral Science seminar, October 2012.
133. Blumsack, Seth and Mostafa Sahraei-Ardakani, “Market-Based Control of Flexible Transmission Architectures,” Center for Nonlinear Studies, Los Alamos National Laboratory, Santa Fe NM, May 2012.
134. Barrows, Clayton and Seth Blumsack, “Computationally Efficient Transmission Switching,” Center for Nonlinear Studies, Los Alamos National Laboratory, Santa Fe NM, May 2012.

135. Blumsack, Seth, "Diminishing Returns to Network Flexibility," Skolkovo Foundation, Moscow, Russia, November 2011.
136. Blumsack Seth, Alisha Fernandez and Patrick Reed, "Policy Conflicts in the Utilization of Hydroelectric Dams for Eastern Wind Integration," Western Energy Policy Conference, Boise ID, August 2011.
137. Fernandez, Alisha, Seth Blumsack and Patrick Reed, "Evaluating the Costs of Alternative Wind Integration Policies," International Green Energy Economy Conference, Washington DC, July 2011.
138. Blumsack, Seth, "Natural Gas Pricing Dynamics," Workshop on Industrial Natural Gas Utilization, University Park PA, June 2011.
139. Blumsack, Seth, "The Future of U.S. Natural Gas," presentation before Credit Suisse, State College PA, April 2011.
140. Blumsack, Seth, "Economics of Marcellus Shale Natural Gas," Bayer Public Policy Forum, April 2011.
141. Blumsack, Seth, "Marcellus Shale Development and Mid-Atlantic Natural Gas Markets," GlobalCon Exposition, Philadelphia, March 2011.
142. Blumsack, Seth, "The New Age of Electric Power Systems," presentation to Penn State IEEE Power and Energy Society Student Chapter, March 2011.
143. Blumsack, Seth, "Energy Systems Economics Research at Penn State," presentation to the Office of Fossil Energy, U.S. Department of Energy, March 2011, Washington D.C.
144. Blumsack, Seth, "U.S. Natural Gas Markets," Marcellus Center for Outreach and Research brown bag lunch seminar, February 2011.
145. Blumsack, Seth, "The New Age of U.S. Electricity," presentation at Penn State Energy Day, Washington DC, November 2010.
146. "The Smart Grid," invited speaker, Universidad Autonoma de Barcelona, October 2010.
147. "The Informational Value of Topological Models in Vulnerability Assessments for Electrical Networks," invited seminar, Los Alamos National Laboratory, August 2010.
148. "Living with Sustainable Energy in a Global Society," invited presentation, Best of Greenbuild, Philadelphia PA, May 2010.
149. "The Future of U.S. Natural Gas," invited presentation, Bayer Materials, Pittsburgh PA, May 2010.
150. "Risk-Informed Site Selection for Long-Term Geological CO2 Sequestration," invited presentation, National Energy Technology Laboratory, Pittsburgh PA, May 2010.
151. Blumsack, Seth, "Pennsylvania's Energy Challenges," presentation to the Penn State Alumni Association, Harrisburg PA, March 2010.

152. "The Short-run Emissions Impacts of a Price on Carbon Dioxide Emissions from U.S. Electric Generators," invited seminar speaker, Nicholas School of the Environment, Duke University, November 2009.
153. "Carbon Taxes, Retail Electric Tariffs and Emissions Reductions," invited seminar speaker, Department of Environmental Sciences and Engineering, University of North Carolina-Chapel Hill, November 2009.
154. "Partitioning of Electrical Networks," invited seminar speaker, Los Alamos National Laboratory, March 2009.
155. "The Economics of Nuclear Power," presentation to the student-sponsored Know Nukes Forum, Penn State University, February 2009.
156. "Everything You Never Wanted to Know About Electricity Deregulation," presentation to the Penns Valley Conservation Association, November 2008.
157. "The Real Problem with Merchant Transmission," invited seminar speaker, Department of Economics, West Virginia University, Morgantown WV, November 2008.
158. "Electric Rate Tariffs Under Deregulation in Pennsylvania," invited presentation to Pennsylvania Local Development Districts, Penn State University, October 2008.
159. "Electricity Markets and Carbon Markets," invited briefing before U.S. House and Senate staffers, Washington DC, October 2008 (one briefing was given to House staffers, and one to Senate staffers).
160. "Electricity Prices Under Emissions Constraints," panelist presentation for "Electricity Markets in a Carbon-Constrained World," organized by *Energy Daily* and the Community Power Alliance, Washington DC July 2008.
161. "Prices and Costs for Electric Utilities Under Regulation and Restructuring," invited speaker, Sloan Foundation Industry Studies Program Annual Meeting, Boston MA, May 2008.
162. "Electricity Restructuring: Where Do We Go From Here," invited presentation before the Connecticut State Legislature Energy Committee, Hartford CT, April 2008.

Teaching

Courses Developed and Taught at Penn State University

1. Introduction to Energy and Earth Sciences Economics (ENNEC 100/EBF 200): Introductory course in environmental and natural resource economics. Topics covered include competitive markets; market failures in the presence of public goods and externalities; rent-seeking and problems with regulation; life-cycle environmental impact analysis; non-renewable resources; climate change policy.
2. Environmental Management, Risk and Decision-Making (EMSC 304/EBF 304W): How do companies make decisions when faced with environmental problems? This course introduces business and economics students to basic concepts in decision-making under

uncertainty and the evaluation of technological and environmental risk. Students work on analyzing realistic decision problems in areas related to energy, the environment, and human health and safety. Dr. Blumsack is developing an honors-level version of this course that will be taught beginning in Fall 2012.

3. Energy and Modern Society (EM SC 420): Discussion-based course focused on the sustainable energy transition. Course focus is on the technical, social and regulatory challenges associated with the large-scale transition away from a fossil fuel based energy system.
4. Introduction to the Electric Utility Industry (EBF 483/ENNEC 597): Introduction to the industrial structure of the electricity sector. The course includes in-depth discussion of regulated and de-regulated electricity systems; current and future environmental regulations affecting the electricity industry; the challenge of integrating renewable energy sources into electric grids; and the emerging “smart grid.”
5. Engineering Project Design (EGEE 494): Independent project work by students in the Energy Engineering major at Penn State. Capstone projects supervised by Blumsack include: analyzing the technical feasibility, economic and environmental benefits associated with lowering the moisture content of Powder River Basin coals before shipment to Eastern coal-fired power plants; a design project focused on small-scale solar photovoltaic production for a school district in Pennsylvania; the direct control of residential hot-water heaters to facilitate wind energy integration; and the air quality implications of increased cogeneration utilization in Philadelphia.
6. Integrated Design of Energy Systems (EME 580): Students in the Energy and Mineral Engineering graduate program work in interdisciplinary teams to define, scope and perform design studies that incorporate engineering, environmental, economic and policy dimensions of system design decisions.
7. Theory and Practice of Science and Technology Policy Analysis (EME 525): Graduate-level introduction to the primary tools used in science and technology policy analysis. Topics covered include the micro-economic foundations of cost-benefit analysis; probabilistic risk assessment; basic epidemiology; probabilistic decision-making; risk perception; and an overview of the U.S. federal regulatory process.
8. Distributed Energy Management (A E 597): Team-taught with several instructors for resident and online delivery. Graduate-level introduction to distributed energy systems, with a focus on the local production and delivery of renewable electric energy. Dr. Blumsack developed course material on the economics of small-scale energy systems; energy policy; and markets for electric power.
9. Solar Energy Project Development (A E 597): Team-taught with several instructors for resident and online delivery. Graduate-level introduction to the design, financing and implementation of solar energy projects. Dr. Blumsack developed course material on the economics of renewable energy, project finance and project decision-making.
10. Energy Markets and Energy Policy (EME 801): Graduate-level introduction to markets for crude-oil, petroleum products, natural gas, renewable energy and electric energy. The course provides students with a quantitatively-oriented foundation for how project

decision-making is structured in the energy industries; market institutions that influence project development; and regulatory forces that constrain or encourage energy projects.

11. Demand-Side Energy Management (EGEE 497H): Honors-level undergraduate course focused on integrating the demand side into modern electricity markets through energy-efficiency and demand response. In addition to classroom lectures, students work on multi-week projects in residence at the Philadelphia Navy Yard micro-grid, implementing energy management strategies in conjunction with energy customers and energy management firms.
12. Modeling Electric Power Systems (EME 596): Graduate-level introduction to methods and tools for steady-state modeling of power systems and electricity markets. Topics included basic circuit theory and power flow modeling; optimal power flow with and without unit commitment and security constraints; derivation of locational marginal pricing; and linear complementarity models for analyzing power market designs.
13. Energy, the Environment and Our Future (MOOC, co-authored with Richard Alley): One of the first MOOCs offered at Penn State, this 12-week course focuses on the basic science of climate change; the impacts of fossil fuel use on the environment and climate; and technological options for transitioning to a low-carbon energy future. Approximately 40,000 students are participating in the course.

Courses Developed and Taught at Vermont Law School

Energy Business Fundamentals: One-week summer term short-course on markets, regulatory institutions and decision-making in the energy and electric utility sectors.

Courses Developed and Taught at Carnegie-Mellon University

The Transformation of Energy Markets (Spring 2005): Introduction to the transition from regulation to competition and markets in the oil, natural gas, and electric utility industries. Emphasis in the course was placed on understanding the role of technology in facilitating or impeding the transition to competitive markets. Cross-listed in engineering and economics.

University and Professional Service Activities

University Service, Penn State University

Chair, Energy Business and Finance, July 2015 – present
Co-Director, Penn State Initiative for Energy and Environmental Economics and Policy
Promotion and Tenure Committee, Department of Energy and Mineral Engineering, 2013 – 2015
Reviewer of applications to the Schreyer Honors College
Advisory Committee, Earth and Environmental Systems Institute
Advisory Committee, Online Bachelor of Arts Program in Energy and Sustainability Policy
Committee Member, Penn State University Network Science Initiative
Graduate Admissions Committee, Department of Energy and Mineral Engineering
Computing Resources Committee, Department of Energy and Mineral Engineering
Service on eleven Faculty Search Committees (between 2007 and present), Department of Energy and Mineral Engineering; Department of Agricultural Economics, Sociology and Education;

and Penn State Institutes for Energy and the Environment. I chaired two of the eleven search committees, both within the Department of Energy and Mineral Engineering.

Professional Service Activities

Member, U.S. Association for Energy Economics (USAEE). Dr. Blumsack is the faculty advisor for the Penn State Student Chapter of the USAEE.

Member, Society for Risk Analysis

Member, Power Engineering Society (PES) of the IEEE. Dr. Blumsack has been active in four PES technical committees: Power Systems Analysis, Computing and Economics; Subcommittee on Systems Economics; Subcommittee on FACTS; Committee on Test Systems Development.

Member, American Geophysical Union

Member, American Economic Association

Serve as Mini-Track Chair for the Electric Power Engineering and Economics track, Hawaii International Conference on System Sciences

Associate editor, *Journal of Unconventional Oil and Gas Resources* and *Journal of Energy Engineering*

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*, *Fuel Processing Technology*, *Operations Research*

Peer reviewer of proposals for the U.S. Department of Energy, National Science Foundation, the Alfred P. Sloan Foundation and the MIT-Skolkovo Initiative

Energy Intensity Metrics review panel member for the U.S. Environmental Protection Agency

External review board member, Energy Policy Institute, Boise State University and Idaho National Laboratory

Advisory Board member, University of Wyoming EPSCoR

Awards and Honors

Hess Energy Faculty Fellow in Energy and Mineral Engineering

Thomas P. Ryan, Jr. Faculty Fellow in the College of Earth and Mineral Sciences, July 2011 – present.

Scholar-in-Residence, Penn State Earth and Environmental Systems Institute, 2011.

Best Paper Award, Hawaii International Conference on Systems Sciences, January 2011.

Wilson Research Initiation Award, College of Earth and Mineral Sciences, Pennsylvania State University

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.

Consulting and Advisory Activities

Alfred P. Sloan Foundation

American Public Power Association

Bayer Materials

Congressional Research Service

Consortium for Risk Evaluation with Stakeholder Participation

Connecticut Department of Public Utility Control

Maryland Public Service Commission

Minnesota Attorney General’s Office

National Renewable Energy Laboratory

New York State Energy Research and Development Agency

Praxair Corporation

RAND Corporation

U.S. Department of Energy

U.S. Environmental Protection Agency

Vermont Electric Cooperative

Vermont Energy Investment Corporation

Graduate Students Advised

Dr. Blumsack is the primary advisor for 5 M.S. and Ph.D. students in the Department of Energy and Mineral Engineering, and has served as external advisor for 8 students outside of Energy and Mineral Engineering. Dr. Blumsack also advises Undergraduate Honors Theses in the Energy and Mineral Engineering Department.

Current M.S. and Ph.D. Advising in the Energy and Mineral Engineering Department

1. Anand Govindarajan, Ph.D. Candidate, Energy Management and Policy
2. Nicholas Johnson, Ph.D. Candidate, Energy Management and Policy
3. Roger Mina, Ph.D. Candidate, Energy Management and Policy
4. Oladipu Ositelu, Ph.D. Student, Energy and Mineral Engineering
5. Mehdi Shariari, Ph.D. Candidate, Energy Management and Policy

**Past M.S. and Ph.D. Advising in the Energy and Mineral Engineering Department
(students listed in alphabetical order)**

6. Clayton Barrows, Energy Management and Policy (Ph.D. 2012)
7. Mesude Bayracki, Energy and Mineral Engineering (M.S. 2011)
8. Allison Boehm, M.S. Student, Energy and Mineral Engineering (M.S. 2013)
9. Mercedes Cortes, Energy and Mineral Engineering (M.S. 2012)
10. Suman Gautam, Energy Management and Policy (Ph.D., 2015)
11. Alisha Fernandez (NSF Graduate Fellow, M.S. 2011, Ph.D., 2014)
12. Evan Frye, M.S. Student, Energy and Mineral Engineering (M.S. 2011)
13. Anand Govindarajan, Energy and Mineral Engineering (M.S. 2012)
14. Babatunde Idrisu, Energy Management and Policy (M.S. 2012)
15. Katrina Kumpf, MEnergy Management and Policy (M.S. 2014)
16. Zhi Li, Ph. Energy Management and Policy (Ph.D. 2015)
17. Yuxi Meng, Energy Management and Policy (Ph.D., 2014)
18. Akil Mesiwala, Energy Management and Policy (M.S., 2014)
19. Temitope Phillips, Energy and Mineral Engineering (Ph.D. 2012)
20. Stefan Nagy, Combined B.S./M.S., Energy Business and Finance (2012)
21. Mostafa Sahraei-Ardakani, Energy Management and Policy (Ph.D. 2012)
22. Farid Tayari, Energy Management and Policy (Ph.D. 2014)
23. Egdabon Udegbe, Energy Management and Policy (M.S., 2014)
24. Lucas Witmer, Energy and Mineral Engineering (M.S. 2011)

External M.S. and Ph.D. Advising

25. Hanyan Shen, M.S. Student, Architectural Engineering, Penn State University
26. Guillermo Orellana, M.S. Student, Architectural Engineering, Penn State University
27. Mohammad Heidarinejad, Ph.D. Candidate, Mechanical Engineering, Penn State University.
28. Marc McNeill, M.S. Candidate, Industrial and Manufacturing Engineering, Penn State University.
29. David Beevers, Ph.D. Candidate, Mechanical Engineering, Penn State University.

30. Pedro Neto, Ph.D. Candidate, Industrial Engineering, Penn State University (ABD 2013).
31. Tabitha Coulter, Ph.D. Candidate, Architectural Engineering, Penn State University (ABD 2012).
32. Eric Hittinger, Ph.D., Engineering and Public Policy, Carnegie-Mellon University. Date of Graduation: August 2012.
33. Steven McGuenegle, M.S., Geography, Penn State University. Date of Graduation: May 2009.
34. Steven McLaughlin, Ph.D Candidate, Computer Science and Engineering, Penn State University (ABD 2011).
35. Adam Newcomer, Ph.D., Engineering and Public Policy, Carnegie-Mellon University. Date of Graduation: May 2008.
36. Kathleen Spees, Ph.D., Engineering and Public Policy, Carnegie-Mellon University. Date of Graduation: May 2008.
37. Jason Wiegler, Ph.D., Rural Sociology, Penn State University. Date of Graduation: May 2010.

Undergraduate Honors Advising

38. Emily Shutt, Energy Business and Finance. Date of Graduation: May 2009.
39. Stephon Smith, Economics (Co-Advise with Andrew Kleit). Date of Graduation: August 2010.
40. Kelsey Richardson, Energy Business and Finance. Date of Graduation: May 2011.
41. Megan Carbine, Energy Business and Finance. Date of graduation: May 2012.
42. Drew Miller, Energy Business and Finance. Date of graduation: 2013.
43. Bridget Dougherty, Energy Business and Finance. Date of graduation: 2014.
44. Connor Brady, Energy Business and Finance. Date of graduation: 2014.
45. Josh Clothiaux, Engineering Science and Mechanics. Expected graduation May 2016.

Grant and Contract Funding

Since July 2007, Dr. Blumsack has been Principal Investigator on 17 funded grants and contracts, with a combined value of over \$2,000,000.

Dr. Blumsack has also been Co-Principal Investigator on 15 funded grants and contracts, with a combined value of over \$9,500,000; and has been Senior Investigator on 5 funded grants and contracts, with a combined value of over \$730,000.

Current Grant and Contract Funding

“Cyber-SEES: Climate-Aware Renewable Hydropower Generation and Disaster Avoidance”

Funding Agency: National Science Foundation
Amount: \$227,980
PI: Seth Blumsack
Period: 9/15/13 – 8/31/16
Annual Support: 0.5 person-month

“Collaborative Research: Transforming Power: Regional Transmission Organizations Managing Tension and Networking Innovation”

Funding Agency: National Science Foundation
Amount: \$144,470
PI: Seth Blumsack
Period: 9/1/13 – 8/31/16
Annual Support: 0.5 person-month

“Impacts of Energy Efficient Building Innovation in Greater Philadelphia: Year 3”

Funding Agency: Energy Efficient Buildings Energy Innovation HUB (DOE Prime)
Amount: \$126,971
PI: Seth Blumsack
Period: 2/1/13 – 1/31/14
Annual Support: 1.2 person-month

“The Next Generation Power Converter”

Funding Agency: National Energy Technology Laboratory
Amount: \$50,000
PI: Seth Blumsack
Period: 2/1/13 – 11/30/13
Annual Support: 0.2 person-month

“Dynamic Air Quality Management”

Funding Agency: U.S. Environmental Protection Agency
Amount: \$250,000
PI: J. Jason West (Blumsack Co-PI)
Period: 6/1/12 – 5/31/14
Annual Support: 1 person-month

“Portfolio Approach to Demand Response and Energy Storage in the Smart Grid”

Funding Agency: Korean Electric Power (Korean Ministry of Knowledge prime)
Amount: 255,000,000 Korean won (approximately \$250,000)
PI: Anastasia Shcherbakova (Blumsack Investigator)
Period: 12/1/11 – 11/30/13
Annual Support: 1 person-month

“Incorporating Environmental Risk into Business Decision-Making Education”

Funding Agency: Hess Energy

Amount: \$40,000

PI: Seth Blumsack

Period: 10/1/11 – 12/31/13

“Marcellus Matters: Education for Adults in Science and Engineering”

Funding Agency: National Science Foundation

Amount: \$2,541,418

PI: Michael Arthur (Blumsack Co-PI)

Period: 9/1/11 – 8/31/14

Annual Support: 0.5 person-month

“Problem-Focused Honors Education in Environmental Risk and Decision-Making”

Funding Agency: Schreyer Honors College, Penn State University

Amount: \$2,000

PI: Seth Blumsack

Period: 10/1/11 – 12/31/12

“Industrial Carbon Management”

Funding Agency: NETL

Amount: \$285,259

PI: Seth Blumsack

Period: 11/1/10 – 11/30/13

Annual Support: 0.5 person-month

“GridSTAR Smart Grid Training Center”

Funding Agency: U.S. Department of Energy

Amount: \$5,000,000

PI: David Riley (Blumsack Co-PI)

Period: 9/1/10 – 8/31/13

Annual Support: 1 person-month

“ARRA: The eEnergy Vermont Consumer Feedback Behavior Study”

Funding Agency: Vermont Electric Company, Inc. (U.S. Department of Energy prime)

Amount: \$247,599

PI: Seth Blumsack

Period: 5/31/10 – 8/31/14

Support: 1 person-month

“Penn State Electricity Markets Initiative,”
Funding Agency: Consortium of Electric Utilities
Amount: \$240,000
PI: Andrew Kleit (Blumsack Co-PI)
Period: 1/1/10 – 12/31/13
Annual Support: 0.5 person-month

“Cyber-Security in the Smart Grid,”
Funding Agency: Penn State Institutes of Energy and the Environment
Amount: \$50,000
PI: Seth Blumsack
Period: 1/1/10 – 12/31/13
Annual Support: 0.5 person-month

“Mid-Atlantic Clean Energy Application Center”
Funding Agency: U.S. Department of Energy
Amount: \$497,375
PI: James Freihaut (Blumsack Co-PI)
Period: 10/1/09 – 9/30/13
Annual Support: 0.5 person-month

Past Grant and Contract Funding

“Impacts of Energy Efficient Building Innovation in Greater Philadelphia: Year 2”
Funding Agency: Energy Efficient Buildings Energy Innovation HUB (DOE Prime)
Amount: \$313,189
PI: Seth Blumsack
Period: 2/1/12 – 1/31/13
Annual Support: 1 person-month

“Philadelphia Navy Yard Network Operations Center”
Funding Agency: Energy Efficient Buildings Energy Innovation HUB (DOE Prime)
Amount: \$169,836
PI: Williams Agate (Blumsack Co-PI)
Period: 2/1/12 – 1/31/13
Annual Support: 1.2 person-month

“Wind Energy Workforce Development: Science, Engineering and Technology,”
Funding Agency: U.S. Department of Energy
Amount: \$398,456
PI: George Lesieutre (Blumsack Co-PI)
Period: 10/1/09 – 12/31/12

Annual Support: 0.5 person-month

“Pennsylvania Wind for Schools Program”

Funding Agency: U.S. Department of Energy

Amount: \$180,000

PI: Susan W. Stewart (Blumsack Investigator)

Period: 7/1/09 – 12/31/12

Annual Support: 0.5 person-month

“The Next Generation Power Converter: Demonstration Site Plan and Development”

Funding Agency: National Energy Technology Laboratory

Amount: \$50,000

PI: Gregory Dobbs (Blumsack Co-PI)

Period: 7/1/12 – 11/30/12

Annual Support: 0.2 person-month

“Design and Evaluation of a Natural Gas Micro-Grid”

Funding Agency: Little Pine Resources and Ben Franklin Technology Partners

Amount: \$75,000

PI: Seth Blumsack

Period: 6/1/11 – 5/31/12

Annual Support: 0.5 person-month

“Regulating the Smart Grid”

Funding Agency: KeyLogic Corporation (NETL Prime)

Amount: \$33,000

PI: Seth Blumsack

Period: 2/1/12 – 9/30/12

Annual Support: 0.75 person-month

“Economic Impacts of Climate Change in Pennsylvania: 2011 Update”

Funding Agency: Pennsylvania Department of Environmental Protection

Amount: \$100,000

PI: James Shortle (Blumsack Senior Investigator)

Period: 9/1/11 – 3/31/12

Annual Support: 0.5 person-month

“Demand Response at the Philadelphia Navy Yard”

Funding Agency: Energy Efficient Buildings Energy Innovation HUB (DOE Prime)

Amount: \$125,000

PI: Andrew Kleit (Blumsack Co-PI)

Period: 2/1/11 – 1/31/13

Annual Support: 0.5 person-month

“Risk-Informed Site Selection for the Long-Term Geologic Sequestration of Carbon Dioxide”

Funding Agency: NETL

Amount: \$73,000

PI: Seth Blumsack

Period: 11/1/10 – 1/31/12

Annual Support: 0.5 person-month

“Impacts of Energy Efficient Building Innovation in Greater Philadelphia: Year 1”

Funding Agency: Energy Efficient Buildings Energy Innovation HUB (DOE Prime)

Amount: \$125,000

PI: Seth Blumsack

Period: 2/1/11 – 1/31/12

Annual Support: 1.5 person-month

“Update of the Economic Impacts of Marcellus Shale Natural Gas Development,”

Funding Agency: Marcellus Shale Commission

Amount: \$100,000

PI: Seth Blumsack

Period: 2/1/11 – 8/31/11

Support: 1 person-month

“The Impacts of Chinese Production of Rare Earth Elements on U.S. Sustainability Policy”

Funding Agency: Penn State Institutes of Energy and the Environment

Amount: \$45,000

PI: Andrew Kleit (Blumsack Co-PI)

Period: 6/1/10 – 5/31/11

Support: 0.05 person-month

“Load Deliverability Assessment Support for PJM Using Tools from Complex Networks”

Funding Agency: PJM Interconnect

Amount: \$67,885

PI: Seth Blumsack

Period: 1/1/09 – 12/31/10

Support: 0.05 person-month

“The Economic Impacts of Marcellus Shale Natural Gas Development,”

Funding Agency: Marcellus Shale Commission

Amount: \$100,000

PI: Seth Blumsack

Period: 2/1/10 – 12/31/10
Support: 1.08 person-month

“Wilson Research Initiation Grant: Measuring the Impact of Utility-Scale Wind Integration,”
Funding Agency: College of Earth and Mineral Sciences, Penn State University
Amount: \$10,000
PI: Seth A. Blumsack
Period: 7/1/09 – 6/30/10

“Impacts of Electricity Restructuring on Rural Pennsylvania,”
Funding Agency: Center for Rural Pennsylvania
Amount: \$100,000
PI: Andrew Kleit (Blumsack Co-PI)
Period: 1/1/08 – 5/31/10

“Greenhouse Gas Inventory for Pennsylvania’s Electricity Generation Sector”
Funding Agency: Pennsylvania Department of Environmental Protection
Amount: \$100,000
PI: Seth Blumsack
Period: 12/1/08 – 9/1/09

“Economic Impacts of Climate Change in Pennsylvania”
Funding Agency: Pennsylvania Department of Environmental Protection
Amount: \$193,954
PI: James Shortle (Blumsack Senior Investigator)
Period: 12/1/08 – 9/1/09

“Regulatory and Institutional Barriers to Micro-Grid Deployment”
Funding Agency: Ford Foundation
Amount: \$10,000
PI: Amy Glasmeier (Blumsack Senior Investigator)
Period: 10/1/08 – 8/31/09

“Small Grant for Exploratory Research: Characterizing Power Networks with Tools from
Complex Networks”
Funding Agency: National Science Foundation
Amount: \$84,438
PI: Paul Hines (Blumsack Co-PI)
Period: 8/31/08 – 9/1/09

“Identifying and Mitigating Risk in PJM with Tools from Complex Networks”

Funding Agency: PJM Interconnection, LLC

Amount: \$69,365

PI: Paul Hines (Blumsack Co-PI)

Period: 8/31/08 – 9/1/09

“Integrated Reservoir/Surface Analysis of Natural Gas Systems”

Funding Agency: NCL Natural Resources

Amount: \$24,609

PI: Luis Ayala (Blumsack Co-PI)

Period: 6/1/08 – 12/1/08

“Engineering Analysis of a Natural Gas Gathering System and the Determination of its Optimum Operating Condition”

Funding Agency: NCL Natural Resources

Amount: \$24,609

PI: Luis Ayala (Blumsack Co-PI)

Period: 1/1/08 – 5/1/08