

STEVEN A. FENRICK

Leader, Economics & Market Research Group

SUMMARY OF EXPERIENCE AND EXPERTISE

- Leader of PSE's Economics and Market Research group which conducts research in the fields of DSM, performance benchmarking, incentive regulation, load research and forecasting, and survey design and implementation
- Manages PSE's cost, productivity, and reliability performance benchmarking practice
- Directs research on value-based reliability planning efforts for electric utilities
- Expert in performance-based ratemaking and incentive regulation
- Directs economic research on investigating the impacts and costs/benefits of DSM programs and designing statistically robust pilot designs

PROFESSIONAL EXPERIENCE

Power System Engineering, Inc.– Madison, WI (2009 to present)

Leader, Economics and Market Research

Responsible for providing consulting services to utilities and regulators in the areas of reliability and cost benchmarking, incentive regulation, value-based reliability planning, demand-side management including demand response and energy efficiency, load research, load forecasting, end-use surveys, and market research.

- Leads research, on an annual basis, with over a dozen electric utilities in evaluating cost, productivity, and reliability performance and uncovering methods to improve their operations
- Benchmarking consultant to the Ontario Energy Board regarding their 3rd Generation Incentive Regulation Plan for the last two years
- In the process of designing and analyzing DSM pilot projects at over 25 electric utilities across the country
- Testimony experience regarding performance value-based reliability planning, benchmarking and productivity analysis
- Has given several presentations on performance benchmarking and productivity analysis, costs and benefits of DSM programs, and measurement and verification (M&V) techniques.
- Key speaker at EUCI conferences regarding cost and reliability performance evaluation and productivity analysis of distribution utilities

Pacific Economics Group – Madison, WI (2001 - 2009)

Senior Economist

- Co-authored research reports submitted as testimony in numerous proceedings in several states and in international jurisdictions. Research topics included statistical benchmarking, alternative regulation, and revenue decoupling.

- Managed and supervised PEG support staff in research and marketing efforts.

EDUCATION

University of Wisconsin - Madison, WI

Bachelor of Science, Economics (Mathematical Emphasis)

University of Wisconsin - Madison, WI

Master of Science, Agriculture and Applied Economics

Publications & Papers

- “Peak-Time Rebate Programs: A Success Story”, *TechSurveillance*, July 2014 (with David Williams and Chris Ivanov).
- “Demand Impact of a Critical Peak Pricing Program: Opt-In and Opt-Out Options, Green Attitudes and other Customer Characteristics”, *The Energy Journal*, January 2014. (With Lullit Getachew, Chris Ivanov, and Jeff Smith).
- “Evaluating the Cost of Reliability Improvement Programs”, *The Electricity Journal*, November 2013. (With Lullit Getachew)
- “Expected Useful Life of Energy Efficiency Improvements”, Cooperative Research Network, 2013 (with David Williams).
- “Cost and Reliability Comparisons of Underground and Overhead Power Lines”, *Utilities Policy*, March 2012. (With Lullit Getachew).
- “Formulating Appropriate Electric Reliability Targets and Performance Evaluations”, *Electricity Journal*, March 2012. (With Lullit Getachew)
- “Enabling Technologies and Energy Savings: The Case of EnergyWise Smart Meter Pilot of Connexus Energy”, November 2012. (With Chris Ivanov, Lullit Getachew, and Bethany Vittetoe)
- “The Value of Improving Load Factors through Demand-Side Management Programs”, Cooperative Research Network, 2012 (with David Williams and Chris Ivanov).
- “Estimation of the Effects of Price and Billing Frequency on Household Water Demand Using a Panel of Wisconsin Municipalities”, *Applied Economics Letters*, 2012, 19:14, 1373-1380.
- “Altreg Rate Designs Address Declining Average Gas Use”, *Natural Gas & Electricity*. April 2008. (With Mark Lowry, Lullit Getachew, and David Hovde).
- “Regulation of Gas Distributors with Declining Use per Customer”, *Dialogue*. August 2006. (With Mark Lowry and Lullit Getachew).
- “Balancing Reliability with Investment Costs: Assessing the Costs and Benefits of Reliability-Driven Power Transmission Projects.” April 2011. *RE Magazine*.
- “Ex-Post Cost, Productivity, and Reliability Performance Assessment Techniques for Power Distribution Utilities”. Master’s Thesis.
- “Demand Response: How Much Value is Really There?” *PSE whitepaper*.
- “How is My Utility Performing” *PSE whitepaper*.
- “Improving the Performance of Power Distributors by Statistical Performance Benchmarking” *PSE whitepaper*.
- “Peak Time Rebate Programs: Reducing Costs While Engaging Customers” *PSE whitepaper*.
- “Performance Based Regulation for Electric and Gas Distributors” *PSE whitepaper*.

- “Revenue Decoupling: Designing a Fair Revenue Adjustment Mechanism” *PSE whitepaper*.

Expert Witness Experience

- Docket EB-2015-0004, Hydro Ottawa, Custom Incentive Regulation Application.
- Docket 15-SPEE-357-TAR, Application for Southern Pioneer Electric Cooperative, Inc., Demand Response Peak Time Rebate Pilot Program.
- Docket EB-2014-0116, Toronto Hydro, Custom Incentive Regulation Application.
- Docket EB-2010-0379, The Coalition of Large Distributors in Ontario regarding “Defining & Measuring Performance”.
- Docket No. 6690-CE-198, Wisconsin Public Service Corporation, “Application for Certificate of Authority for System Modernization and Reliability Project”.
- Expert Witness presentation to Connecticut Governors “Two Storm Panel”, 2012.
- Docket No. EB-2012-0064, Toronto Hydro’s Incremental Capital Module (ICM) request for added capital funding.
- Docket No. 09-0306, Central Illinois Light rate case filing.
- Docket No. 09-0307, Central Illinois Public Service Company rate case filing.
- Docket No. 09-0308, Illinois Power rate case filing.

Recent Conference Presentations

- Wisconsin Manager’s Meeting, “Reliability Target Setting Using Econometric Benchmarking”. November 2016.
- Institute of Public Utilities Advanced Rate Conference at Michigan State University, “Performance Benchmarking”. October 2016.
- Wisconsin Electric Cooperative Association (WECA) Conference, “An Introduction to Peak Time Rebates”. September 2016.
- Institute of Public Utilities Advanced Rate Conference at Michigan State University, “Performance Benchmarking”. October 2015.
- EUCI conference chair, 2015. “Evaluating the Performance of Gas and Electric Distribution Utilities.”
- Institute of Public Utilities Advanced Rate Conference at Michigan State University, “Performance Benchmarking”. October 2014.
- Cooperative Exchange Conference, Williamsburg VA. “Smart Thermostat versus AC Direct Load Control Impacts”. August 2014.
- EUCI conference chair in Chicago. “The Economics of Demand Response”. February 2014.
- Institute of Public Utilities Advanced Rate Conference at Michigan State University, “Performance Benchmarking”. October 2013.
- EUCI conference chair in Chicago. “Evaluating the Performance of Gas and Electric Distribution Utilities.” August 2013.
- Presentation to the Ontario Energy Board, “Research and Recommendations on 4th Generation Incentive Regulation”.
- Presentation to the Canadian Electricity Association’s best practice working group. 2013

- Conference chair for EUCI conference in March 2013 titled, “Performance Benchmarking for Electric and Gas Distribution Utilities.”
- Presentation to the board of directors of Great Lakes Energy on benchmarking results, December 2012.
- Presentation on making optimal infrastructure investments and the impact on rates, Electricity Distribution Association, Toronto, Ontario. November 2012.
- Conference chair for EUCI conference in August 2012 titled, “Performance Benchmarking for Electric and Gas Distribution Utilities.”
- 2012 presentation in Springfield, IL to the Midwest Energy Association titled, “Reliability Target Setting and Performance Evaluation”.
- 2012 presentation in Springfield, IL to the Midwest Energy Association titled, “Making the Business Case for Reliability-Driven Investments”.
- Conference chair for EUCI conference in 2012 titled, “Balancing, Measuring, and Improving the Cost and Reliability Performance of Electric Distribution Utilities”. St. Louis.
- Conference chair for EUCI conference in 2012 titled, “Demand Response: The Economic and Technology Considerations from Pilot to Deployment”. St. Louis.
- 2012 Presentation in the Missouri PSC Smart Grid conference entitled, “Maximizing the Value of DSM Deployments”. Jefferson City.
- 2011 conference chair on a nationwide benchmarking conference for rural electrical cooperatives. Madison.
- 2011 presentation on optimizing demand response program at the CRN Summit. Cleveland.
- Conference chair for EUCI conference in 2011 titled, “Balancing, Measuring, and Improving the Cost and Reliability Performance of Electric Distribution Utilities”. Denver.
- 2010 presentation on cost benchmarking techniques for REMC. Wisconsin Dells.

History of Major Research Projects

1. Washington Utilities Transportation Commission (UTC) Reliability Benchmarking and Target-Setting for 3 Washington IOUs, 2017.
2. Hydro One Networks total cost benchmarking research, 2017.
3. Hydro One Networks total factor productivity research, 2016/2017.
4. Butte Electric Peak Time Rebate full deployment, 2017.
5. Southern Pioneer Pre-pay metering cost-benefit research, 2016.
6. Sunflower Electric load forecasts, 2015-ongoing.
7. PG&E customer satisfaction benchmarking and target setting, 2016.
8. Vectren reliability benchmarking and target setting, 2016.
9. Butte Electric PTR pilot design, implementation, and M&V. 2015/2016.
10. Central Wisconsin demand response dispatch model, 2015-present.

11. Cost and reliability econometric benchmarking in Custom Incentive Regulation filing, Hydro Ottawa, 2015.
12. Long-range load forecasts for six distribution utilities and G&T, Sunflower Electric, 2015.
13. Load research study review and VEE process review, Minnesota Power, 2015.
14. Demand Side Management Business Case Guidebook, CRN, 2015/2016.
15. Prepare research, design, and application to Kansas Commission on Peak Time Rebate Pilot for Southern Pioneer Electric Cooperative, 2015.
16. Cost and reliability econometric benchmarking in Custom Incentive Regulation filing, Toronto Hydro, 2014/2015.
17. Emergency response benchmarking for gas utilities, Vectren, 2014.
18. Set-up DSM pilots and optimize portfolio, Sunflower G&T, 2014/2015.
19. Central Wisconsin Electric demand response study, 2014/2015.
20. Long range load forecasts for Wolverine, Allegheny, and Sunflower, 2014.
21. Spatial load forecast for Rochester Public Utilities, 2014.
22. Revenue requirement and cost of service study for Todd-Wadena, 2014.
23. Development of a performance based regulation plan for Toronto Hydro. 2013/2014.
24. Set internal econometric reliability targets for Great Lakes Energy, 2014.
25. Conduct research, provide recommendations, and provide expert witness testimony on the 4th Generation Incentive Regulation on behalf of the Coalition of Large Distributors, 2013.
26. Testimony for Wisconsin Public Service Corporation (WPS) regarding the cost effectiveness of their reliability-driven capital project, 2013.
27. Transmission & Distribution Cost Benchmarking for Pacific Gas & Electric, 2013.
28. Evaluation and review of business cases for reliability-driven projects, Toronto Hydro, 2012/2013.
29. Cost and reliability benchmarking research for Toronto Hydro, 2012/2013.
30. Transmission and distribution cost benchmarking research for Vectren, 2013.
31. Power plant benchmarking for coal and natural gas fired plants, Sunflower Electric, 2012.
32. Peak Time Rebate demand response calculations, Heartland Electric, 2012-present.
33. Resource planning and integration of DSM resources, Sunflower Electric, 2012.

34. Energy efficiency whitepaper on estimating Effective Useful Life, Cooperative Research Network, 2012.
35. Demand response whitepaper on the value proposition of increasing distribution load factors via demand response, Cooperative Research Network, 2012.
36. Energy efficiency rebate optimization, Corn Belt, 2012.
37. Energy efficiency and demand response customer baseline load algorithm development for an MDM system vendor, 2012.
38. Incentive Regulation Productivity and Benchmarking, Enbridge Gas Distribution, 2011/2012
39. Reliability Benchmarking and Target Setting, Vectren 2011/2012
40. DSM potential analysis, South Central Indiana, 2011/2012
41. Annual benchmarking updates of Ontario's 77 power distribution utilities, OEB 2011
42. Cost and reliability benchmarking research involving a group of 20 electric utilities, 2011
43. Energy Efficiency program design and cost effectiveness, Corn Belt 2011
44. Cost/Benefit model of direct load control, Corn Belt 2011
45. Peak time rebate demand response program design and cost effectiveness, Heartland 2011/2012
46. Value Based Reliability Planning project at New Hampshire Electric Cooperative, 2010
47. DSM research on pilots at 25 electric utilities, 2010-2014, DOE Stimulus Grant.
48. Benchmarking research involving a group of 14 electric utilities, 2010
49. M&V research of OPower energy efficiency program, 2010.
50. M&V research of Smart Thermostat demand response program, 2010.
51. Benchmarking research regarding Union Electric, 2010
52. Benchmarking research regarding the three Ameren Illinois Utilities, 2009
53. Benchmarking research for Central Vermont Public Service, 2009
54. Benchmarking research on Oklahoma Gas & Electric, 2009
55. Research North American power industry revenue forecast precedents, HECO, 2008.
56. Revenue Adjustment Mechanism for CVPS Revenue Decoupling Proposal, CVPS, 2008.
57. Productivity Research for Bundled Power Service, HECO, 2008.
58. A&G Power Benchmarking Research. 2008.
59. Productivity Research of Ontario's Power Distribution Utilities, OEB, 2008.

60. Productivity Research of U.S. Power Generation and Distribution, APS, 2007.
61. Productivity Research of Northeast Power Distribution, CMP, 2007.
62. Productivity Research of Ontario's Gas Distribution Utilities, OEB, 2007.
63. Benchmarking Research of Ontario's Power Distribution Utilities, OEB, 2007.
64. Benchmarking Research of Electric A&G Expenses, Michigan PSC, 2006.
65. Productivity Research for Gas Distribution, Sempra, 2006.
66. Productivity Research for Power Distribution, Sempra, 2006.
67. Benchmarking Research for Gas Distribution, Nstar Gas, 2006.
68. Benchmarking Research for Power Distribution, Central Vermont PSC, 2005.
69. Benchmarking Research of Nuclear Power Generation, Sempra, 2005.
70. Research on Rate Trends for Electric Power, EEI, 2005.
71. Benchmarking Research of Bundled Power Service, Florida Power, 2005.
72. Benchmarking Research of Canadian Electric Distribution, Hydro One, 2005.
73. Benchmarking Research of Gas Distribution, Bay State, 2005.
74. Benchmarking Research of Electric Distribution, Aquaelectra, 2004.
75. Benchmarking Research for the Caribbean Water Distribution Industry, Aquaelectra, 2004.
76. Compensatory Rate Trend for the U.S. Gas Industry, 2004.
77. Productivity Research for the U.S. Electrical industry, TXU, 2004.
78. Research on Productivity and Benchmarking for Queensland, Australia Electrical Companies, 2004.
79. Research on Productivity and Benchmarking for Gas and Electric Industries for Sempra, 2004.
80. Research on Productivity and Benchmarking for Jamaican Power Company. JPS, 2003-4.
81. Cost analysis research and benchmarking for the Bolivian Power regulator, 2003.
82. Research on Productivity and Benchmarking for a Canadian Power Transmission Company, 2002.
83. Research on Productivity and Benchmarking for a Natural Gas Distributor. Boston Gas, 2002-3.
84. Research on Benchmarking for Bundled Power Service. AmerenUE, 2002

85. Statistical Benchmarking for Electric Power Transmission. Transcend, 2002.
86. Statistical Benchmarking for three Australian Gas Utilities, 2001.
87. Power Distribution TFP trends for Bangor Hydro, 2001.