BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

IN THE MATTER OF THE APPLICATION OF	)	
OKLAHOMA GAS AND ELECTRIC COMPANY	)	
FOR AN ORDER OF THE COMMISSION	)	Cause No. PUD 201100087
AUTHORIZING APPLICANT TO MODIFY ITS	)	
RATES, CHARGES, AND TARIFFS FOR RETAIL	)	
ELECTRIC SERVICE IN OKLAHOMA	)	

Direct Testimony

of

Mark Newton Lowry

on behalf of

Oklahoma Gas and Electric Company

July 28, 2011

I. INTRODUCTION AND BACKGROUND

Q. **Please state your name, position, and business address.**

A. My name is Mark Newton Lowry. I am the President of Pacific Economics Group ("PEG") Research LLC. My business address is 22 E. Mifflin Street, Suite 302, Madison, WI 53705. I am testifying in this proceeding on behalf of Oklahoma Gas and Electric Company ("OG&E" or "the Company").

Q. **What are your responsibilities in your role as company president?**

A. PEG Research is a company in the Pacific Economics Group consortium which is active in the fields of utility performance research and regulation. Our practice, which has four PhD economists, is international in scope and has to date included projects in eleven countries. We work for a mix of utilities, regulators, consumer groups, and public agencies and this has given us a reputation for objectivity and dedication to regulatory science. For example, power distributors in the Canadian province of Ontario operate under multiyear rate plans with terms that are linked to a benchmarking study I directed for the Ontario Energy Board. My duties as President of PEG Research include the management of the company, supervision of cost-performance research, and the provision of expert witness testimony.

Q. **Please discuss your background and experience in the energy and utility industries.**

A. I have been an energy economist for twenty five years and have spent the last twenty years doing research and consulting on the utility industry. Before assuming my present

position, I was a partner of Pacific Economics Group LLC for eight years and managed its Madison office. Prior to that, I worked at Christensen Associates in Madison, first as a Senior Economist and later as a Vice President. The primary focus of my consulting research has been the cost performance of gas and electric utilities. I have been a pioneer in the use of scientific cost research in energy utility regulation.

Before becoming a consultant I spent five years as an academic economist. I was an Assistant Professor of Mineral Economics at the Pennsylvania State University, where I taught energy economics. I also worked as a Visiting Professor at l'Ecole des Hautes Etudes Commerciales in Montreal. My academic research and teaching stressed the use of statistics in industry analysis.

I have served as a referee for several scholarly journals and have an extensive record of professional publications and public appearances. My publications include articles on benchmarking in the *Electricity Journal*, *Energy Policy*, and the *Energy Journal*. I hold a Ph.D. in applied economics from the University of Wisconsin, which is noted for its strength in economic statistics. My resume is provided as Exhibit MNL-1 to my testimony.

Q. **Please discuss your experience as an expert witness.**

A. I have testified many times on utility performance and other regulatory issues. Most of this testimony has involved cost research. In addition to Oklahoma, where I have previously testified on the cost performance of OG&E, I have testified in Alberta, British Columbia, California, Colorado, the District of Columbia, Georgia, Hawaii, Illinois, Kentucky, Maine, Massachusetts, Missouri, New York, Ontario, Quebec, Rhode Island,

and Vermont. Further details of my testimony can be found in my resume, which is attached as Exhibit MNL-1.

II. PURPOSE OF TESTIMONY

Q. **What is the purpose of your testimony?**

A. I have been asked by OG&E to analyze its non-fuel operation and maintenance ("O&M") expenses, particularly those expenses devoted to generation maintenance. To do so, I performed statistical benchmarking studies of these costs. This testimony provides a high level summary of these studies. The details of the studies are provided in the report which is attached hereto as Exhibit MNL-2.

Q. **How does your testimony relate to the testimony of other company witnesses?**

A. My testimony and the attached report provide a quantitative assessment of the Company's recent cost efficiency. The Company will be submitting additional testimony (by OG&E witness Donald R. Rowlett) which will address the specifics of how OG&E achieves its operating efficiency and remains a low-cost electric provider for customers.

III. SUMMARY OF STUDY

Q. **Why are benchmarking studies used in general rate cases?**

A. In a rate case, a utility's ability to effectively manage its cost is an important consideration for a commission in determining appropriate rate increases. Nonfuel O&M expenses are the largest component of base rate cost that a utility can attempt to control in the short run and are thus a natural focus for an efficiency inquiry. These expenses are

also sufficiently large as to warrant rate increases when it can be demonstrated that the cost of an efficient utility is rising.

Benchmarking studies can address the issue of cost efficiency and are facilitated by the extensive operating data that utilities report to government agencies. However, performance appraisals are still difficult to make accurately. There are important differences between utilities in the scale of their operations, the facilities that they operate, and in other business conditions that influence their cost. It is often beyond the expertise of participants in the regulatory process to draw the right conclusions about efficiency from available data. Consultants with expertise in the field are thus occasionally retained by the various parties to regulation, including regulatory commissions, to prepare benchmarking studies.

Q. **What is statistical benchmarking and how is it useful in measuring utility performance?**

A. Statistical benchmarking is quite simply an approach to performance benchmarking that uses statistics. Any use of data on the operations of other utilities to create cost benchmarks is an exercise in statistics because the data are statistics. In addition, statistical methods such as econometrics are sometimes employed to identify the external business conditions that drive utility cost. This information can be used to develop benchmarks that properly reflect the impact that local business conditions will typically have on the cost of a particular utility such as OG&E.

Since statistical benchmarking can shed light on utility performance, it has become a widely used tool. Managers use benchmarking to gauge how well their companies are

operating. Statistical benchmarking is also used increasingly in regulation, and regulatory benchmarking is encouraged in a recent report of the National Regulatory Research Institute.[1]

Q. **Please provide more details of your benchmarking studies for OG&E.**

A. The cost performance of OG&E was appraised using two well-established benchmarking methods: econometric modeling and unit cost indexing. Using both benchmarking methods, we measured the Company's cost performance in the three most recently completed years: 2008-2010. The data used to calculate the benchmarks were drawn entirely from respected public sources such as the Federal Energy Regulatory Commission ("FERC") Form 1. To calculate the costs of OG&E in 2010, we added to their reported FERC Form 1 expenses approximately $5.9 million to normalize the cost of a generation maintenance contract.

Q. **Please explain the econometric benchmarking method.**

A. Guided by cost theory, we developed econometric models of the impact that various quantifiable business conditions have on the non-fuel O&M and generation maintenance expenses of vertically integrated electric utilities ("VIEUs") like OG&E. Each business condition variable in the two cost models has a parameter that measures its cost impact. We estimated these parameters econometrically using large samples of historical data on the costs of U.S. VIEUs and the business conditions that they faced. This procedure identifies important drivers of utility cost and gauges their relative importance.

[1] Evgenia Shumilkina, *Utility Performance*: *How Can State Commissions Evaluate it Using Indexing, Econometrics, and Data Envelopment Analysis?* National Regulatory Research Institute 10-05, 2010.

The samples were more than adequate for the development of credible cost models. Numerous cost drivers were identified. Both models do a good job of explaining the sampled data. All parameter estimates are plausible and virtually all have high statistical significance.

We used each econometric benchmarking model to "predict" OG&E's corresponding cost during each year of the 2008-2010 period. The cost predictions are the benchmarks and reflect OG&E's local business conditions. As a final step, we compared OG&E's actual cost to the econometric benchmarks. Performance is good to the extent that OGE's actual costs are low compared to their respective benchmarks.

Q. **Please explain the unit cost method.**

A. For each cost category, we compared the Company's cost per unit of output to the average unit cost across a peer group using unit cost indexes. A unit cost index is the ratio of a cost index to an output index. It provides an automatic adjustment, prior to making a peer group comparison, for differences in the operating scale of utilities, thereby facilitating the inclusion of utilities of varying sizes in an OG&E peer group. There were different peer groups for generation maintenance and nonfuel O&M expenses. Most of the peers are current or former members of the Southwest Power Pool.

Q. **Why are there different peer groups for the two cost categories?**

A. The selection of the peer group plays a key role in the accuracy of benchmarking using a unit cost index. Economic theory and our econometric research reveal that both categories of cost depend on numerous business conditions in addition to operating scale.

The companies in the peer group should face cost pressures from these additional business conditions that are similar on balance to those faced by OG&E. It is sometimes difficult to find a large number of peers that face similar business conditions.

Our econometric work on generation maintenance expenses revealed that the mix of generation capacity is the most important consideration in the choice of a unit cost peer group. Most of the Company's capacity is fueled by clean-burning natural gas. OG&E also has some power plants that burn sub-bituminous western coal but does not scrub the exhaust from these plants because of the coal's low sulfur content. Since maintenance expenses for the fossil steam generation and other (chiefly gas-fired) power generation capacity that OG&E owns are itemized on the FERC Form 1, we can use these itemized data in our research and thereby choose peers, like Entergy Arkansas and Northern States Power, that have nuclear generation capacity provided that they match up particularly well to OG&E with respect to their fossil generation capacity mix.

In a study of *total* O&M expenses, which include expenses for nuclear generation, Entergy Arkansas and Northern States Power are inappropriate peers because they have nuclear operations, which typically involve high O&M. As replacements for these companies in the O&M peer group, we have chosen three utilities in the South Central region. Two of these—Cleco and Southwestern Electric Power—have a little more solid-fuel generating capacity than OG&E, do not exclusively burn western coal in this capacity, and scrub some of their emissions from solid-fuel combustion. The third utility—Entergy Mississippi—does burn western coal without scrubbing, but relies more on gas fired generation than OG&E does.

Q. **Please explain the output index that you use in your unit cost calculations.**

A. Because it is difficult to characterize the operating scale of utilities using only one output variable, the output indexes used in our two studies summarized multiple output comparisons between OG&E and the peer group by taking a weighted average of the comparisons. In the study of O&M expenses, for instance, we compared OG&E's scale to the averages for the peer group using generation volume, generation capacity, and the number of customers served. The weights for the output indexes (*e.g.* how much weight to place on the generation volume), like the selection of peer groups, were guided by our econometric research on utility cost drivers.

Q. **What are the results of your benchmarking work for non-fuel O&M expenses, as they relate to OG&E?**

A. The non-fuel O&M expenses of OG&E were found to be about 20% below the benchmarks produced by the econometric model on average from 2008 to 2010. This performance was in the top quartile and sixth best in a sample of 45 utilities. In other words, more than three quarters of the utilities in the econometric sample had costs that compared less favorably to their benchmarks during these years. In 2010, non-fuel O&M expenses were about 12% below the benchmark produced by the econometric model. This was also a top quartile performance. OG&E's ability to be a top cost performer year after year is, in my professional opinion, quite remarkable.

Using the unit cost indexes, we found that OG&E's unit O&M cost was a substantial 23% below the norm for the peer group on average from 2008 to 2010. The Company's unit cost was 19% below the peer group norm in 2010. The results that we obtained using

the unit cost benchmarking method, which as I have explained involve sensible peer group comparisons, thus corroborate the results we obtained econometrically and support the finding that OG&E continues to be a superior cost performer.

Q. **What are the results of your benchmarking work for generation maintenance?**

A. The generation maintenance expenses of OG&E were found to be about 25% below the benchmarks generated by our econometric maintenance cost model on average from 2008 to 2010. This performance was in the top quartile. In 2010, generation maintenance expenses were about 4% below the benchmark produced by the econometric model. This was a second quartile performance.

Using the unit cost index, we found that OG&E's unit generation maintenance cost was a substantial 22% below the peer group norm on average from 2008 to 2010. The Company's unit cost was about 10% below the peer group norm in 2010. Using both benchmarking methods we therefore found that OG&E's generation maintenance expenses, while higher than in the past, were still quite reasonable in 2010.

Q. **Does this conclude your prepared direct testimony?**

A. Yes, it does.

Exhibit MNL-1

RESUME OF
MARK NEWTON LOWRY

July 2011

Home Address:	1511 Sumac Drive Madison, WI 53705 (608) 233-4822	**Business Address:**	22 E. Mifflin St., Suite 302 Madison, WI 53703 (608) 257-1522 Ext. 23

Date of Birth: August 7, 1952

Education: High School: Hawken School, Gates Mills, Ohio, 1970
BA: Ibero-American Studies, University of Wisconsin-Madison, May 1977
Ph.D.: Agricultural and Resource Economics, University of Wisconsin -Madison, May 1984

Relevant Work Experience, Primary Positions:

Present Position **President, Pacific Economics Group Research LLC, Madison WI**

Chief executive of the research unit of the Pacific Economics Group consortium. Leads internationally recognized practice in alternative regulation ("Altreg") and utility statistical research. Other research specialties include: codes of competitive conduct, markets for oil and gas, and commodity storage. Duties include senior management, supervision of research, and expert witness testimony.

October 1998-February 2009 **Partner, Pacific Economics Group LLC, Madison, WI**

Managed PEG's Madison office. Specific duties include project management and research, written reports, public presentations, expert witness testimony, personnel management, and marketing.

January 1993-October 1998 **Vice President**
January 1989-December 1992 **Senior Economist, Christensen Associates, Madison, WI**

Directed the company's Regulatory Strategy group. Participated in all Christensen Associates testimony on PBR and statistical benchmarking for energy utilities during these years.

Aug. 1984-Dec. 1988 **Assistant Professor, Department of Mineral Economics, The Pennsylvania State University, University Park, PA**

Responsibilities included research and graduate and undergraduate teaching and advising. Courses taught: Min Ec 387 (Introduction to Mineral Economics); 390 (Mineral Market Modeling); 484 (Political Economy of Energy and the Environment) and 506 (Applied Econometrics). Teaching and research specialty: analysis of markets for energy products and metals.

August 1983-July 1984 **Instructor, Department of Mineral Economics, The Pennsylvania State University, University Park, PA**

Taught courses in Mineral Economics (noted above) while completing Ph.D. thesis.

April 1982-August 1983 **Research Assistant, Department of Agricultural and Resource Economics, University of Wisconsin-Madison**

Dissertation research under Dr. Peter Helmberger on the role of speculative storage in markets for field crops. Work included the development of an econometric rational expectations model of the U.S. soybean market.

March 1981-March 1982 **Natural Gas Industry Analyst, Madison Consulting Group, Madison, Wisconsin**

Research under Dr. Charles Cicchetti in two areas:

- Impact of the Natural Gas Policy Act on the production and average wellhead price of natural gas in the United States.
- Research supporting litigation testimony in an antitrust suit involving natural gas producers and pipelines in the San Juan Basin of New Mexico.

Relevant Work Experience, Visiting Positions:

May-August 1985 **Professeur Visiteur, Centre for International Business Studies, Ecole des Hautes Etudes Commerciales, Montreal, Quebec.**

Research on the behavior of inventories in non-competitive metal markets.

Major Consulting Projects:

1. Research on Gas Market Competition for a Western Electric Utility. 1981.
2. Research on the Natural Gas Policy Act for a Northeast Trade Association. 1981.
3. Interruptible Service Research for an Industry Research Institute. 1989.
4. Research on Load Relief from Interruptible Services for a Northeast Electric Utility. 1989.
5. Design of Time-of-Use Rates for a Midwest Electric Utility. 1989.
6. PBR Consultation for a Southeast Gas Transmission Company. 1989.
7. Gas Transmission Productivity Research for a U.S. Trade Association. 1990.
8. Productivity Research for a Northeast Gas and Electric Utility. 1990-91.
9. Comprehensive Performance Indexes for a Northeast Gas and Electric Utility. 1990-1991.
10. PBR Consultation for a Southeast Electric Utility. 1991.
11. Research on Electric Revenue Adjustment Mechanisms for a Northeast Electric Utility. 1991.
12. Productivity Research for a Western Gas Distributor. 1991.
13. Cost Performance Indexes for a Northeast U.S. Gas and Electric Utility. 1991.
14. Gas Transmission Rate Design for a Western U.S. Electric Utility. 1991.
15. Gas Supply Cost Indexing for a Western U.S. Gas Distributor. 1992.
16. Gas Transmission Strategy for a Western Electric Utility. 1992.
17. Design and Negotiation of Comprehensive Benchmark Incentive Plans for a Northeast Gas and Electric Utility. 1992.
18. Gas Supply Cost Benchmarking and Testimony for a Northeast U.S. Gas Distributor, 1992.
19. Bundled Power Service Productivity Research for a Western Electric Utility. 1993-96.
20. Development of PBR Options for a Western Electric Utility. 1993.
21. Review of the Regional Gas Transmission Market for a Western Electric Utility. 1993.
22. Productivity and PBR Research and Testimony for a Northeast Electric Utility. 1993.
23. Productivity and PBR Research and Testimony for a Northeast Electric Utility. 1994.

24. Productivity Research for a Western Gas Distributor. 1994.
25. White Paper on Price Cap Regulation for a U.S. Trade Association. 1994.
26. Bundled Power Service Benchmarking for a Western Electric Utility. 1994.
27. White Paper on PBR for a U.S. Trade Association. 1995.
28. Productivity Research and PBR Plan Design for a Northeast Gas and Electric Company. 1995.
29. Regulatory Strategy for a Restructuring Canadian Electric Utility. 1995.
30. PBR Consultation for a Japanese Electric Utility. 1995.
31. Regulatory Strategy for a Restructuring Northeast Electric Utility. 1995.
32. Productivity Research and Plan Design Testimony for a Western Gas Distributor. 1995.
33. Productivity Testimony for a Northeast Gas Distributor. 1995.
34. Speech on PBR for a Western Electric Utility. 1995.
35. Development of a PBR Plan for a Midwest Gas Distributor. 1996.
36. Stranded Cost Recovery and Power Distribution PBR for a Northeast Electric Utility. 1996.
37. Benchmarking and Productivity Research and Testimony for a Northeast Gas Distributor. 1996.
38. Consultation on Gas Production, Transmission, and Distribution PBR for a Latin American Regulator. 1996.
39. Power Distribution Benchmarking for a Northeast Electric Utility. 1996.
40. Testimony on PBR for a Northeast Power Distributor. 1996.
41. Bundled Power Service Benchmarking for a Northeast Electric Utility. 1996.
42. Design of Gas Distributor Service Territories for a Latin American Regulator. 1996.
43. Bundled Power Service Benchmarking for a Northeast Electric Utility. 1996.
44. Service Quality PBR for a Canadian Gas Distributor. 1996.
45. Productivity and PBR Research and Testimony for a Canadian Gas Distributor. 1997.
46. Bundled Power Service Benchmarking for a Northeast Electric Utility. 1997.
47. Design of a Price Cap Plan for a South American Regulator. 1997.
48. White Paper on Utility Brand Name Policy for a U.S. Trade Association. 1997.
49. Bundled Power Service Benchmarking and Testimony for a Western Electric Utility. 1997.
50. Review of a Power Purchase Contract Dispute for a Midwest City. 1997.
51. Research on Benchmarking and Stranded Cost Recovery for a U.S. Trade Association. 1997.
52. Research and Testimony on Productivity Trends for a Northeast Gas Distributor. 1997.
53. PBR Plan Design, Benchmarking, and Testimony for a Southeast Gas Distributor. 1997.
54. White Paper on Power Distribution PBR for a U.S. Trade Association. 1997-99.
55. White Paper and Public Appearances on PBR Options for Australian Power Distributors. 1997-98.
56. Gas and Power Distribution PBR Research and Testimony for a Western Energy Utility. 1997-98.
57. Research on the Cost Structure of Power Distribution for a U.S. Trade Association. 1998.
58. Research on Cross-Subsidization for a U.S. Trade Association. 1998.
64. Testimony on Brand Names for a U.S. Trade Association. 1998.
65. Research and Testimony on Economies of Scale in Power Supply for a Western Electric Utility. 1998.
66. PBR Plan Design and Testimony for a Western Electric Utility. 1998-99.
67. PBR and Bundled Power Service Testimony and Testimony for Two Southeast U.S. Electric Utilities. 1998-99.
68. Statistical Benchmarking for an Australian Power Distributor. 1998-9.
69. Testimony on Functional Separation of Power Generation and Delivery for a U.S. Trade Association. 1998.
70. Design of a Stranded Benefit Passthrough Mechanism for a Restructuring Electric Utility. 1998.
71. Consultation on PBR and Code of Conduct Issues for a Western Electric Utility. 1999.
72. PBR and Bundled Power Service Benchmarking Research and Testimony for a Southwest Electric Utility. 1999.
73. Power Transmission and Distribution Cost Benchmarking for a Western Electric Utility. 1999.
74. Cost Benchmarking for Three Australian Power Distributors. 1999.
75. Bundled Power Service Benchmarking for a Northeast Electric Utility. 1999.
76. Benchmarking Research for an Australian Power Distributor. 2000.

77. Critique of a Commission-Sponsored Benchmarking Study for Three Australian Power Distributors. 2000.
78. Statistical Benchmarking for an Australian Power Transco. 2000.
79. PBR and Benchmarking Testimony for a Southwest Electric Utility. 2000.
80. PBR Workshop (for Regulators) for a Northeast Gas and Electric Utility. 2000.
81. Research on Economies of Scale and Scope for an Australian Electric Utility. 2000.
82. Research and Testimony on Economies of Scale in Power Delivery, Metering, and Billing for a Consortium of Northeast Electric Utilities. 2000.
83. Research and Testimony on Service Quality PBR for a Consortium of Northeast Energy Utilities. 2000.
84. Power and Natural Gas Procurement PBR for a Western Electric Utility. 2000.
85. PBR Plan Design for a Canadian Natural Gas Distributor. 2000.
86. TFP and Benchmarking Research for a Western Gas and Electric Utility. 2000.
87. E-Forum on PBR for Power Procurement for a U.S. Trade Association. 2001.
88. PBR Presentation to Florida's Energy 2000 Commission for a U.S. Trade Association. 2001.
89. Research on Power Market Competition for an Australian Electric Utility. 2001.
90. TFP and Other PBR Research and Testimony for a Northeast Power Distributor. 2000.
91. PBR and Productivity for a Canadian Electric Utility. 2002.
92. Statistical Benchmarking for an Australian Power Transco. 2002.
93. PBR and Bundled Power Service Benchmarking Research and Testimony for a Midwest Energy Utility. 2002.
94. Consultation on the Future of Power Transmission and Distribution Regulation for a Western Electric Utility. 2002.
95. Benchmarking and Productivity Research and Testimony for Two Western U.S. Energy Distributors. 2002.
96. Workshop on PBR (for Regulators) for a Canadian Trade Association. 2003.
97. PBR, Productivity, and Benchmarking Research for a Mid-Atlantic Gas and Electric Utility. 2003.
98. Workshop on PBR (for Regulators) for a Southeast Electric Utility. 2003.
99. Strategic Advice for a Midwest Power Transmission Company. 2003.
100. PBR Research for a Canadian Gas Distributor. 2003.
101. Benchmarking Research and Testimony for a Canadian Gas Distributor. 2003-2004.
102. Consultation on Benchmarking and Productivity Issues for Two British Power Distributors. 2003.
103. Power Distribution Productivity and Benchmarking Research for a South American Regulator. 2003-2004.
104. Statistical Benchmarking of Power Transmission for a Japanese Research Institute. 2003-4.
105. Consultation on PBR for a Western Gas Distributor. 2003-4.
106. Research and Advice on PBR for Gas Distribution for a Western Gas Distributor. 2004.
107. PBR, Benchmarking and Productivity Research and Testimony for Two Western Energy Distributors. 2004.
108. Advice on Productivity for Two British Power Distributors. 2004.
109. Workshop on Service Quality Regulation for a Canadian Trade Association. 2004.
110. Strategic Advice for a Canadian Trade Association. 2004.
111. White Paper on Unbundled Storage and Local Gas Markets for a Midwestern Gas Distributor. 2004.
112. Statistical Benchmarking Research for a British Power Distributor. 2004.
113. Statistical Benchmarking Research for Three British Power Distributors. 2004.
114. Benchmarking Testimony for Three Ontario Power Distributors. 2004.
115. Indexation of O&M Expenses for an Australian Power Distributor. 2004.
116. Statistical Benchmarking of O&M Expenses for a Canadian Gas Distributor. 2004.
117. Benchmarking Testimony for a Canadian Power Distributor. 2005.
118. Statistical Benchmarking for a Canadian Power Distributor. 2005.
119. White Paper on Power Distribution Benchmarking for a Canadian Trade Association. 2005.
120. Statistical Benchmarking for a Southeast Bundled Power Utility. 2005.

121. Statistical Benchmarking of a Nuclear Power Plant and Testimony. 2005.
122. White Paper on Utility Rate Trends for a U.S. Trade Association. 2005.
123. TFP Research for a Northeast U.S. Power Distributor. 2005.
124. Seminars on PBR and Statistical Benchmarking for a Northeast Electric Utility. 2005.
125. Statistical Benchmarking and Testimony for a Northeast U.S. Power Distributor. 2005.
126. Testimony Transmission PBR for a Canadian Electric Utility. 2005.
127. TFP and Benchmarking Research and Testimony for Two California Energy Utilities. 2006.
128. White Paper on Power Transmission PBR for a Canadian Electric Utility. 2006.
129. Testimony on Statistical Benchmarking for a Canadian Electric Utility. 2006.
130. White Paper on PBR for Major Plant Additions for a U.S. Trade Association. 2006.
131. PBR Plan Design for a Canadian Regulatory Commission. 2006.
132. White Paper on Regulatory Benchmarking for a Canadian Trade Association. 2007.
133. Productivity Research and Testimony for a Northeastern Power Distributor. 2007.
134. Revenue Decoupling Research and Presentation for a Northeast Power Distributor. 2007.
135. Gas Utility Productivity Research and PBR Plan Design for a Canadian Regulator. 2007.
136. Productivity Research and PBR Plan Design for a Western Bundled Power Service Utility. 2007.
137. Statistical Benchmarking for a Canadian Energy Regulator. 2007.
138. Research and Testimony in Support of a Revenue Adjustment Mechanism for a Northeastern Power Utility. 2008.
139. Consultation on Alternative Regulation for a Midwestern Electric Utility. 2008.
140. Research and Draft Testimony in Support of a Revenue Decoupling Mechanism for a Large Midwestern Gas Utility. 2008.
141. White Paper: Use of Statistical Benchmarking in Regulation. 2005-2009.
142. Statistical Cost Benchmarking of Canadian Power Distributors. 2007-2009.
143. Research and Testimony on Revenue Decoupling for 3 US Electric Utilities. 2008-2009.
144. Benchmarking Research and Testimony for a Midwestern Electric Utility. 2009.
145. Consultation and Testimony on Revenue Decoupling for a New England DSM Advisory Council. 2009.
146. Research and Testimony on Forward Test Years and the Cost Performance of a Vertically Integrated Western Electric Utility. 2009.
147. White Paper for a National Trade Association on the Importance of Forward Test Years for U.S. Electric Utilities. 2009-2010.
148. Research and Testimony on Altreg for Western Gas and Electric Utilities Operating under Decoupling. 2009-2010.
149. Research and Report on PBR Designed to Incent Long Term Performance Gains. 2009-2010.
150. Research and Report on Revenue Decoupling for Ontario Gas and Electric Utilities. 2009-2010.
151. Research and Testimony on the Performance of a Western Electric Utility. 2009-2010.
152. Research on Decoupling for a Western Gas Distributor. 2009-2010.
153. Research on AltReg Precedents for a Midwestern Electric Utility. 2010.
154. Research on Revenue Decoupling for a Northwestern Gas & Electric Utility. 2010.
155. Benchmarking Research and Report on the Performance of a Midwestern Electric Utility. 2010.
156. Research and Testimony on Forward Test Years and the cost performance of a large Western Gas Distributor. 2010-2011.
157. Research and Testimony in Support of Revenue Decoupling for a Midwestern Power Distributor. 2010-2011.
158. Benchmarking Research and Report on the Generation Maintenance Performance of a Midwestern Electric Utility. 2010-2011.
159. Research on the Design of an Incentivized Formula Rate for a Canadian Gas Distributor. 2010-2011.
160. White Paper for a National Trade Association on Approaches to Reduce Regulatory Lag. 2010-2011.
161. Research and Testimony for an Eastern Power Distributor on the Problem of Regulatory Lag. 2011.
162. Benchmarking Research and Testimony on the Performance of a Midwestern Electric Utility. 2011.

Publications:

1. Public vs. Private Management of Mineral Inventories: A Statement of the Issues. Earth and Mineral Sciences 53, (3) Spring 1984.
2. Review of Energy, Foresight, and Strategy, Thomas Sargent, ed. (Baltimore: Resources for the Future, 1985). Energy Journal 6 (4), 1986.
3. The Changing Role of the United States in World Mineral Trade in W.R. Bush, editor, The Economics of Internationally Traded Minerals. (Littleton, CO: Society of Mining Engineers, 1986).
4. Assessing Metals Demand in Less Developed Countries: Another Look at the Leapfrog Effect. Materials and Society 10 (3), 1986.
5. Modeling the Convenience Yield from Precautionary Storage of Refined Oil Products (with junior author Bok Jae Lee) in John Rowse, ed. World Energy Markets: Coping with Instability (Calgary, AL: Friesen Printers, 1987).
6. Pricing and Storage of Field Crops: A Quarterly Model Applied to Soybeans (with junior authors Joseph Glauber, Mario Miranda, and Peter Helmberger). American Journal of Agricultural Economics 69 (4), November, 1987.
7. Storage, Monopoly Power, and Sticky Prices. les Cahiers du CETAI no. 87-03 March 1987.
8. Monopoly Power, Rigid Prices, and the Management of Inventories by Metals Producers. Materials and Society 12 (1) 1988.
9. Review of Oil Prices, Market Response, and Contingency Planning, by George Horwich and David Leo Weimer, (Washington, American Enterprise Institute, 1984), Energy Journal 8 (3) 1988.
10. A Competitive Model of Primary Sector Storage of Refined Oil Products. July 1987, Resources and Energy 10 (2) 1988.
11. Modeling the Convenience Yield from Precautionary Storage: The Case of Distillate Fuel Oil. Energy Economics 10 (4) 1988.
12. Speculative Stocks and Working Stocks. Economic Letters 28 1988.
13. Theory of Pricing and Storage of Field Crops With an Application to Soybeans [with Joseph Glauber (senior author), Mario Miranda, and Peter Helmberger]. University of Wisconsin-Madison College of Agricultural and Life Sciences Research Report no. R3421, 1988.
14. Competitive Speculative Storage and the Cost of Petroleum Supply. The Energy Journal 10 (1) 1989.
15. Evaluating Alternative Measures of Credited Load Relief: Results From a Recent Study For New England Electric. In Demand Side Management: Partnerships in Planning for the Next Decade (Palo Alto: Electric Power Research Institute,1991).
16. Futures Prices and Hidden Stocks of Refined Oil Products. In O. Guvanen, W.C. Labys, and J.B. Lesourd, editors, International Commodity Market Models: Advances in Methodology and Applications (London: Chapman and Hall, 1991).
17. Indexed Price Caps for U.S. Electric Utilities. The Electricity Journal, September-October 1991.
18. Gas Supply Cost Incentive Plans for Local Distribution Companies. Proceedings of the Eight NARUC Biennial Regulatory Information Conference (Columbus: National Regulatory Research Institute, 1993).
19. TFP Trends of U.S. Electric Utilities, 1975-92 (with Herb Thompson). Proceedings of the Ninth NARUC Biennial Regulatory Information Conference, (Columbus: National Regulatory Research Institute, 1994).
20. A Price Cap Designers Handbook (with Lawrence Kaufmann). (Washington: Edison Electric Institute, 1995.)
21. The Treatment of Z Factors in Price Cap Plans (with Lawrence Kaufmann), Applied Economics Letters 2 1995.
22. Performance-Based Regulation of U.S. Electric Utilities: The State of the Art and Directions for Further Research (with Lawrence Kaufmann). Palo Alto: Electric Power Research Institute, December 1995.

23. Forecasting the Productivity Growth of Natural Gas Distributors (with Lawrence Kaufmann). AGA Forecasting Review, Vol. 5, March 1996.
24. Branding Electric Utility Products: Analysis and Experience in Regulated Industries (with Lawrence Kaufmann), Washington: Edison Electric Institute, 1997.
25. Price Cap Regulation for Power Distribution (with Larry Kaufmann), Washington: Edison Electric Institute, 1998.
26. Controlling for Cross-Subsidization in Electric Utility Regulation (with Lawrence Kaufmann), Washington: Edison Electric Institute, 1998.
27. The Cost Structure of Power Distribution with Implications for Public Policy (with Lawrence Kaufmann), Washington: Edison Electric Institute 1999.
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30. "Performance-Based Regulation and Business Strategy" (with Lawrence Kaufmann), Natural Gas, February 2003
31. "Performance-Based Regulation and Energy Utility Business Strategy (With Lawrence Kaufmann), in Natural Gas and Electric Power Industries Analysis 2003, Houston: Financial Communications, 2003.
32. "Price Control Regulation in North America: The Role of Indexing and Benchmarking", Methods to Regulate Unbundled Transmission and Distribution Business on Electricity Markets: Proceedings, Stockholm: Elforsk, 2003.
33. "Performance-Based Regulation Developments for Gas Utilities (with Lawrence Kaufmann), Natural Gas and Electricity, April 2004.
34. "Econometric Cost Benchmarking of Power Distribution Cost" (with Lullit Getachew and David Hovde), Energy Journal, July 2005.
35. "Alternative Regulation for North American Electric Utilities" (with Lawrence Kaufmann), Electricity Journal, 2006.
36. "Regulating Natural Gas Distributors with Declining Average Use" (with Lullit Getachew and Steven Fenrick), USAEE Dialogue, 2006.
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38. "Price Control Regulation in North America: Role of Indexing and Benchmarking", Electricity Journal, January 2009
39. "Statistical Benchmarking in Utility Regulation: Role, Standards and Methods," (with Lullit Getachew), Energy Policy, 2009.
40. "Alternative Regulation, Benchmarking, and Efficient Diversification", USAEE Dialogue, August 2009.
41. "The Economics and Regulation of Power Transmission and Distribution: The Developed World Case" (with Lullit Getachew), in Lester C. Hunt and Joanne Evans, eds., International Handbook on the Economics of Energy, 2009.
42. "Econometric TFP Targets, Incentive Regulation and the Ontario Gas Distribution Industry," Review of Network Economics, December 2009.

Professional Presentations:

1. American Institute of Mining Engineering, New Orleans, LA, March 1986
2. International Association of Energy Economists, Calgary, AL, July 1987
3. American Agricultural Economics Association, Knoxville, TN, August 1988
4. Association d'Econometrie Appliqué, Washington, DC, October 1988
5. Electric Council of New England, Boston, MA, November 1989
6. Electric Power Research Institute, Milwaukee, WI, May 1990
7. New York State Energy Office, Saratoga Springs, NY, October 1990

8. National Association of Regulatory Utility Commissioners, Columbus, OH, September 1992
9. Midwest Gas Association, Aspen, CO, October 1993
10. National Association of Regulatory Utility Commissioners, Williamsburg, VA, January 1994
11. National Association of Regulatory Utility Commissioners, Kalispell, MT, May 1994
12. Edison Electric Institute, Washington, DC, March 1995
13. National Association of Regulatory Utility Commissioners, Orlando, FL, March 1995
14. Illinois Commerce Commission, St. Charles, IL, June 1995
15. Michigan State University Public Utilities Institute, Williamsburg, VA, December 1996
16. Edison Electric Institute, Washington DC, December 1995
17. IBC Conferences, San Francisco, CA, April 1996
18. AIC Conferences, Orlando, FL, April 1996
19. IBC Conferences, San Antonio, TX, June 1996
20. American Gas Association, Arlington, VA, July 1996
21. IBC Conferences, Washington, DC, October 1996
22. Center for Regulatory Studies, Springfield, IL, December 1996
23. Michigan State University Public Utilities Institute, Williamsburg, VA, December 1996
24. IBC Conferences, Houston TX, January 1997
25. Michigan State University Public Utilities Institute, Edmonton, AL, July 1997
26. American Gas Association, Edison Electric Institute, Advanced Public Utility Accounting School, Irving, TX, Sept. 1997
27. American Gas Association, Washington, DC [national telecast], September 1997
28. Infocast, Miami Beach, FL, Oct. 1997
29. Edison Electric Institute, Arlington, VA, March 1998
30. Electric Utility Consultants, Denver, CO, April 1998
31. University of Indiana, Indianapolis, IN, August 1998
32. Edison Electric Institute, Newport, RI, September 1998
33. University of Southern California, Los Angeles, CA, April 1999
34. Edison Electric Institute, Indianapolis, IN, August 1999
35. IBC Conferences, Washington, DC, February 2000
36. Center for Business Intelligence, Miami, FL, March 2000
37. Edison Electric Institute, San Antonio, TX, April 2000
38. Infocast, Chicago, IL, July 2000
39. Edison Electric Institute, July 2000
40. IOU-EDA, Brewster, MA, July 2000
41. Infocast, Washington, DC, October 2000
42. Wisconsin Public Utility Institute, Madison, WI, November 2000
43. Infocast, Boston, MA, March 2001
44. Florida 2000 Commission, Tampa, FL, August 2001
45. Infocast, Washington, DC, December 2001
46. Canadian Gas Association, Toronto, ON, March 2002
47. Canadian Electricity Association, Whistler, BC, May 2002
48. Canadian Electricity Association, Montreal, PQ, September 2002
49. Ontario Energy Association, Toronto, ON, November 2002
50. Canadian Gas Association, Toronto, ON, February 2003
51. Louisiana Public Service Commission, Baton Rouge, LA, February 2003
52. CAMPUT, Banff, ALTA, May 2003
53. Elforsk, Stockholm, Sweden, June 2003
54. Edison Electric Institute, national eforum, June 2003
55. Eurelectric, Brussels, Belgium, October 2003
56. CAMPUT, Halifax, May 2004
57. Edison Electric Institute, national eforum, March 2005
58. Edison Electric Institute, Madison, August 2005

59. Edison Electric Institute, national e forum, August 2005
60. Edison Electric Institute, Madison, WI, August 2006
61. EUCI, Arlington, VA, 2006
62. EUCI, Arlington, VA, 2006 [Conference chair]
63. EUCI, Seattle, WA, 2007. [Conference chair]
64. Massachusetts Energy Distribution Companies, Waltham, MA, July, 2007.
65. Edison Electric Institute, Madison, WI, July-August 2007.
66. Institute of Public Utilities, Lansing, MI, 2007.
67. EUCI, Denver, CO, 2008. [Conference chair]
68. EUCI, Chicago, IL, 2008. [Conference chair]
69. EUCI, Toronto, ON, 2008. [Conference chair]
70. Edison Electric Institute, Madison WI, August 2008
71. EUCI, Cambridge, MA, March 2009 [Conference chair]
72. Edison Electric Institute, national eforum, May 2009
73. Edison Electric Institute, Madison WI, July 2009
74. EUCI, Cambridge, MA, March 2010[,Conference chair]
75. Edison Electric Institute, Madison, WI, July 2010
76. EUCI, Toronto, ON, November 2010[Conference chair]
77. Edison Electric Institute, Madison, WI, July 2011

Journal Referee:

Agribusiness
American Journal of Agricultural Economics
Energy Journal
Journal of Economic Dynamics and Control
Materials and Society