



Control Number: 24770



Item Number: 110

Addendum StartPage: 3

**DOCKET NO. 24770**

**REPORT OF THE ELECTRIC  
RELIABILITY COUNCIL OF TEXAS  
(ERCOT) TO THE PUCT REGARDING  
IMPLEMENTATION OF THE ERCOT  
PROTOCOLS**

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**PUBLIC UTILITY COMMISSION  
OF TEXAS**

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**COMMISSION STAFF'S RESPONSE TO ORDER NO. 11<sup>1</sup>**

TO THE HONORABLE MARC H. BURNS, ADMINISTRATIVE LAW JUDGE:

Order No. 11 requires the parties to submit a list of witnesses to be made available to the Commissioners and PDD at the July 19<sup>th</sup> technical conference. In addition, the order requires the parties to attempt to agree to aggregation of DPL issues for panel discussions and party alignments. Staff solicited input from parties on aggregation of DPL issues and party alignments, and noted that under Commission Procedural Rule 22.105, Staff is not subject to alignment.

There appears to be consensus among the parties to aggregate the DPL issues as follows:

- Aggregate Staff's proposed DPL issues 3-8.
- Aggregated Staff's proposed DPL issues 9-15.
- Address Staff's proposed DPL issues 1 and 2 within the context of addressing the above two aggregations.

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<sup>1</sup> This pleading uses the following abbreviations: Austin – City of Austin, doing business as Austin Energy; Brazos – Brazos Electric Power Cooperative, Inc.; Commission – Public Utility Commission of Texas; Denton – City of Denton; DPL – decision point list; Garland – City of Garland; LCRA – Lower Colorado River Authority; MOD – Market Oversight Division of the Public Utility Commission of Texas; OxyChem – Occidental Chemical Corporation; PDD – Policy Development Division of the Public Utility Commission of Texas; Staff – staff of the Public Utility Commission of Texas; San Antonio – City Public Service Board of the City of San Antonio; STEC – South Texas Electric Cooperative.

110

However, there remains a dispute among the parties as to the proper statement of the DPL issues. As a result, San Antonio, Austin, LCRA, Denton, Garland, and Brazos agreed to this aggregation subject to their contentions as to the appropriate statement of the DPL issues.<sup>2</sup>

Staff intends to offer the following witnesses:

- Staff's proposed DPL issues 3-8: Shmuel Oren
- Staff's proposed DPL issues 9-15: Shmuel Oren and Keith Rogas

Resumes for these witnesses are attached. In addition, MOD members will attend the technical conference and be available for questions from the Commissioners or PDD.

As noted above, under Commission Procedural Rule 22.105, Staff is not subject to alignment. The only feedback that Staff received on alignment was from STEC, Independent Marketers, and OxyChem. STEC and Independent Marketers stated that they did not believe that they should be aligned with other parties on Staff's proposed DPL issues 9-15. Based on the distinct arguments and interests that these two parties have on these issues, Staff agrees that they should not be aligned with other parties on these issues. OxyChem stated an interest in Staff's proposed DPL issue 8, and stated that it was discussing alignment for that issue with other parties.

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<sup>2</sup> See proposed DPL filed on April 9, 2002; comments on DPL issues filed on April 8, 2002; and Staff's reply to comments on DPL issues, filed on April 10, 2002.

Dated: July 3, 2002

Respectfully Submitted,

Thomas S. Hunter  
Division Director - Legal Division



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### **CERTIFICATE OF SERVICE**

I, Keith Rogas, certify that copies of this document will be served on all parties on July 3, 2002, in accordance with Public Utility Commission of Texas Procedural Rule 22.74.

  
Keith Rogas

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**Dr. Shmuel S. Oren** is Professor of Industrial Engineering and Operations Research at the University of California at Berkeley and former Chairman of that department. Over the last five years he has served as the Berkeley site director of PSerc - a multi-university Power Systems Research Center sponsored by the National Science Foundation and industry members.

Prior to his current position he was on the faculty of The Engineering Economic Systems Department at Stanford University and worked as a Research Scientist at the Xerox Palo Alto Research Center. At Xerox he was involved in the development of market analysis models for new products such as high-speed laser printers.

Dr. Oren has extensive expertise in Operations Research, particularly optimization, and in mathematical modeling and analysis of economic systems. His research and consulting activities over the last two decades have focused on the development of analytical models and tools and on the design and economic analysis of market mechanisms and pricing strategies in the context of the private and public sector and in regulated industries, particularly electric power. Dr. Oren has served as a consultant to New England Electric Systems, Niagara Mohawk Power Corporation, Los Angeles Water and Power District, Xerox Corporation, SRI International, New Zealand Electro Corp., PG&E, Edison International, Entergy, and Hagler Bailly Consulting Co. on issues related to modeling, optimization, market design and pricing policies.

Dr. Oren served as a consultant and reviewer of electricity market rules concerning congestion management, ancillary services and settlements, on behalf of the Brazilian Electricity Regulatory Agency (ANEEL). He is currently a consultant to Market Oversight Division of Public Utility Commission of Texas (PUCT) and to the Alberta Energy Utility Board. He is also involved in a review of the emerging electricity market in Poland for the Polish National System Operator. Dr. Oren served as an expert witness appearing before FERC on behalf of the Bay Area Rapid Transit in a successful contest of a new reliability service tariff imposed by PG&E. He has been a member of a DOE task force preparing a Transmission Grid Study under the Bush Chaney energy initiative. Dr. Oren has published extensively on the subjects of numerical optimization, nonlinear pricing and the application of such pricing in the context of telecommunications and electric power, incentive design, bidding, transmission pricing, electricity market restructuring and other related topics.

Dr. Oren holds B.Sc and M.Sc degrees in Mechanical Engineering from the Technion in Israel and M.S. and Ph.D degrees in Engineering Economic Systems from Stanford University. He is a Senior Member of the IEEE Power Engineering System Society.

## **Shmuel S. Oren - RESUME**

### **CONTACT:**

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### **EDUCATION:**

<b>B.Sc.</b>	<b>(1965)</b>	Mechanical Engineering (Summa Cum Laude), Technion,, Israel.
<b>M.Sc.</b>	<b>(1969)</b>	Materials Engineering, Technion, Israel
<b>M.S.</b>	<b>(1972)</b>	Engineering Economic Systems, Stanford University, Stanford, Calif.
<b>Ph.D.</b>	<b>(1972)</b>	Engineering Economic Systems, Stanford University, Stanford, Calif.

### **RESEARCH AREAS:**

Pricing Strategies and Market Mechanisms  
Electric Power Economics, Planning and Operations  
Coordination Theory  
Optimization

### **PROFESSIONAL EXPERIENCE:**

<i>1984 - Present</i>	Professor, Department of Industrial Engineering and Operations Research, U.C. Berkeley.
<i>1995 - Present</i>	Director of Power System Research Center - Berkeley site
<i>1980 - Present</i>	<b>Consulting:</b> Electric Power Research Institute, SRI International, Applied Decision Analysis Inc., Niagara Mohawk Power Corporation, New England Electric System, Trans Power New Zealand, Pacific Gas and Electric Co., Hagler Bailly Consulting Co., Edison International, Entergy, Brazilian Electricity Regulatory Agency, Texas Public Utility Commission, Polish system operator.
<i>9/99 - 1/00</i>	Visiting Professor, IIT, Madrid Spain.
<i>8/93 - 10/93</i>	Erskine Fellow, University of Canterbury, Christchurch, New Zealand.
<i>1986 - 1992</i>	Chairman, Department of Industrial Engineering and Operations Research, U.C. Berkeley.
<i>5/92 - 7/92</i>	Visiting Professor, American University of Armenia, Yearvan, Armenia.
<i>7/85 - 1/86</i>	Visiting Professor, Tel Aviv University, Israel.
<i>1982 - 1984</i>	Associate Professor, Department of Industrial Engineering and Operations Research, U.C. Berkeley.
<i>1980 - 1982</i>	Associate Professor, Engineering Economic Systems, Stanford University.
<i>1972 - 1980</i>	Consulting Professor Engineering Economic Systems, Stanford University.
<i>1972 - 1980</i>	Research Scientist, Xerox Palo Alto Research Center.
<i>1970 - 1972</i>	Teaching and Research Assistant, Stanford University.
<i>1965 - 1969</i>	Lieutenant, Israeli Defense Forces.

### **SOCIETY MEMBERSHIP:**

Institute for Operations Research and Management Science  
Mathematical Programming Society.  
International Association of Energy Economists  
IEEE, Senior Member

### **EDITORIAL BOARDS:**

Interfaces  
Energy Economics Journal

**I. REFEREED PUBLICATIONS**

**A. Archival Journals:**

1. Oren, Shmuel S. "Self-Scaling Variable Metric Algorithms Without Line-Search for Unconstrained Minimization," *Math Comp.*, V. 27 (1973), pp. 885-973.
2. Oren, Shmuel S. and David G. Luenberger "Self-Scaling Variable Metric (SSVM) Algorithms: Part I: Criteria and Sufficient Conditions for Scaling a Class of Algorithms," *Management Science*, V. 20 (1974), pp. 845-862.
3. Oren, Shmuel S. "Self-Scaling Variable Metric (SSVM) Algorithms: Part II: Implementation and Experiments," *Management Science*, V. 20 (1974), pp. 863-874.
4. Oren, Shmuel S. "On the Selection of Parameters in Self-Scaling Variable Metric Algorithms," *Mathematical Programming*, V. 7 (1974), pp. 351-367.
5. Oren, Shmuel S. "A Mathematical Theory of Man Machine Text Editing," *IEEE Transactions on Systems, Man and Cybernetics*, V. 4 (1974), pp. 258-267.
6. Oren, Shmuel S. "A Mathematical Theory of Man Machine Document Assembly," *IEEE Transactions on Systems, Man and Cybernetics*, V. 5 (1975), pp. 520-526.
7. Oren, Shmuel S. and Michael H. Rothkopf, "Optimal Bidding in Sequential Auctions," *Operations Research*, V. 23, No. 6 (1975), pp. 1080-1090.
8. Oren, Shmuel S. and Emilio Spedicato, "Optimal Conditioning of Self-Scaling Variable Metric Algorithms," *Mathematical Programming*, V. 10, No. 1 (1976), pp. 70-90.
9. Oren, Shmuel S. "On Quasi-Newton and Pseudo-Newton Algorithms," *J. Optimization Theory and Applications*, V. 20, No. 2 (1976), pp. 155-170.
10. Rothkopf, Michael H. and Shmuel S. Oren, "A Closure Approximation for the Nonstationary M/M/S Queue," *Management Science*, V. 25, No. 6 (1979), pp. 522-534.
11. Morris, Peter A. and Shmuel S. Oren, "Multi-Attribute Decision Making by Sequential Resource Allocation," *Operations Research*, V. 8, No. 1 (1980), pp. 233-255.
12. Smith, Stephen A. and Shmuel S. Oren, "Reliability Growth of Repairable Systems," *Naval Logistics Quarterly*, V. 27, No. 4 (1980), pp. 539-547.
13. Oren, Shmuel S., Michael H. Rothkopf and Richard D. Smallwood, "Evaluating a New Market: A Forecasting System for Nonimpact Computer Printers," *Interfaces*, V. 10, No. 6 (1980), pp. 76-87.
14. Oren, Shmuel S., "A Conjugate Directions Method for Subjective Assessment of Normal Distributions," *J. Optimization Theory and Applications*, V. 33, No. 1 (1981), pp. 25-36.



15. Oren, Shmuel S. and Stephen A. Smith, "Critical Mass and Tariff Structure in Electronic Communications Markets," *The Bell Journal of Economics*, V. 12, No. 2 (1981), pp. 467-487.
16. Oren, Shmuel S., "Perspectives on Self-Scaling Variable Metric Algorithms," *J. Optimization Theory and Applications*, V. 37, No. 4 (1982), pp. 137-147.
17. Oren, Shmuel S., Stephen A. Smith and Robert B. Wilson, "Linear Tariffs With Service Quality Discrimination," *The Bell Journal of Economics*, V. 13, No. 2 (Autumn 1982), pp. 455-471.
18. Oren, Shmuel S., Stephen A. Smith and Robert B. Wilson, "Nonlinear Pricing in Markets with Interdependent Demand," *Marketing Science*, V. 1, No. 3 (1982), pp. 287-313.
19. Feinstein, Charles D. and Shmuel S. Oren, "Local Stability Properties of the Modified Hamiltonian Dynamic System," *Journal of Economics, Dynamics and Control*, V. 6 (1983), pp. 387-397.
20. Oren, Shmuel S., Stephen A. Smith and Robert B. Wilson, "Competitive Nonlinear Tariffs," *Journal of Economic Theory*, V. 29, No. 1 (1983), pp. 49-71.
21. Oren, Shmuel S., Stephen A. Smith and Robert B. Wilson, "Pricing a Product Line," *Journal of Business*, V. 57, No. 1, Pt. 2 (1984), pp. S73-S99.
22. Oren, Shmuel S., "Planar Quasi-Newton Methods for Unconstrained Saddlepoint Problems," *Journal of Optimization Theory and Applications*, V. 43, No. 2 (1984), pp. 167-204.
23. Borison, Adam B., Peter A. Morris and Shmuel S. Oren, "A State of the World Decomposition Approach to Dynamics and Uncertainty in Electric Utility Generation Expansion Planning," *Operations Research*, V. 32, No. 5 (1984), pp. 1052-1068.
24. Oren, Shmuel S. and Michael H. Rothkopf, "Market Dynamics Models for New Industrial Product Planning," *Marketing Science*, V. 3, No. 3 (1984), pp. 247-265.
25. Oren, Shmuel S., "Discussant's Comments on: Pricing Research in Marketing the State of the Art," *Journal of Business*, V. 57, No. 1, Pt. 2 (1984), pp. S61-S64.
26. Feinstein, Charles D. and Shmuel S. Oren, "A Newton Type Method for the Implicit Programming Problem," *Mathematics of Operations Research*, V. 9, No. 4 (1985) pp. 336-351.
27. Feinstein, Charles D. and Shmuel S. Oren, "A 'Funnel' Turnpike Theorem for Optimal Growth Problems with Discounting," *Journal of Economics, Dynamics and Control*, V. 9, pp. 25-39 (1985).
28. Dhebar, Anirudh and Shmuel S. Oren, "Optimal Dynamic Pricing for Expanding

Networks," *Marketing Science*, V. 4, No. 4 (1985) pp. 336-351 .

29. Oren, Shmuel S., Stephen A. Smith and Robert B. Wilson, "Capacity Pricing," *Econometrica*, V. 53, No. 3, (1985) pp. 545-567.
30. Oren, Shmuel S. and Stephen G. Powell, "Optimal Supply of a Depletable Resource with Backstop Technology: Heals Theorem Revisited," *Operations Research*, V. 33, No. 2 (1985), pp. 277-292.
31. Oren, Shmuel S. and Shao Hong Wan, "Optimal Strategic Petroleum Reserve Policies: A Steady State Analysis," *Management Science*, V. 32, No. 1, (1986) pp. 14-29.
32. Dhebar, Anirudh and Shmuel S. Oren, "Dynamic Nonlinear Pricing in Markets with Interdependent Demand," *Operations Research*, V. 34, No. 3, (1986) pp. 384-394 .
33. Chao, Hung Po, Shmuel S. Oren, Stephen A. Smith and Robert B. Wilson, "Multi-Level Demand Subscription Pricing for Electric Power," *Energy Economics*, (1986) pp. 199-217.
34. Arbel, Ami and Shmuel S. Oren, "Generating Search Directions in Multi-objective Linear Programming using the Analytical Hierarchy Process," *Socio-Economic Planning Sciences*, V. 30, No. 6, (1986) pp. 369-373.
35. Oren, Shmuel S., Stephen A. Smith and Robert B. Wilson, "Multiproduct Pricing for Electric Power," *Energy Economics*, V. 9, No. 2 (1987), pp. 104-114.
36. Chao, Hung Po, Shmuel S. Oren, Stephen A. Smith and Robert B. Wilson, "Priority Service: Market Structure and Competition," *The Energy Journal*, Special Issue on Electricity Reliability, V. 9 (1988), pp. 77-104.
37. Schwartz, Rick G. and Shmuel S. Oren, "Using Analytic Hierarchies for Consumer Research and Market Modeling," *Mathematical Computer Modeling*, V. 11 (1988), pp. 266-271.
38. Oren, Shmuel S. and Rick G. Schwartz, "Diffusion of New Products in Risk Sensitive Markets Modeling," *Journal of Forecasting*, V. 7, No 4 (1988), pp. 273-287.
39. Powell, Stephen G. and Shmuel S. Oren, "The Transition to Nondepletable Energy: Social Planning and Market Models of Capacity Expansion," *Operations Research*, V. 37, No. 3 (1989), pp. 373-383.
40. Oren, Shmuel S. and Joseph A. Doucet, "Interruption Insurance for Generation and Distribution of Electric Power," *Journal of Regulatory Economics*, V. 2 (1990), pp. 5-19.
41. Oren, Shmuel S. and Stephen A. Smith, "Discussion of Paper by Rau and Hegazy," *IEEE Transaction on Power Systems*, V. 6, No. 2, (May 1991).
42. Oren, Shmuel S. and Stephen A. Smith, "Design and Management of Curtailable Electricity Service to Reduce Annual Peaks," *Operations Research*, V. 40, No. 2 (1992),

pp. 213-238. Also in Service Opportunities for Electric Utilities: Proceedings of the EPRI/UEERG Symposium, Held at UC Berkeley, September 1990. (Oren and Smith Ed.), Kluwer Publishing Co., (1993).

43. Kamien, Morton I., Shmuel S. Oren and Yair Tauman, "Licensing of Cost Reducing Innovation," *Journal of Mathematical Economics*, V. 21 (1992), pp. 483-508.
44. Doucet, Joseph A. and Shmuel S. Oren, "Onsite Backup Generation and Interruption Insurance for Electricity Distribution," *Energy Economics*, V. 12, No. 4 (1992), pp. 79-93.
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46. Arbel, Ami and Shmuel S. Oren, "Generating Interior Search Directions for Multiobjective Linear Programming," *Journal of Multi-Criteria Decision Analysis*, V. 2 (1993), pp. 73-86.
47. Bushnell, James B. and Shmuel S. Oren, "Bidder Cost Revelation in Electric Power Auctions," *Journal of Regulatory Economics*, V. 6, No. 1 (1994), pp. 5-26.
48. Strauss, Todd P. and Shmuel S. Oren., "Priority Ordering in Interruptible Electric Power Service with Irreversible Early Notification," *Probability in Engineering and Information Sciences*, V 8, (1994) pp. 287-290.
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50. Braden, David J. and Shmuel S. Oren, "Nonlinear Pricing to Produce Information," *Marketing Science*, Vol. 13, No. 3 (1994) pp. 310-326.
51. Svoboda, Alva J. and Shmuel S. Oren, "Integrating Price-based Resources in Short-term Scheduling of Electric Power Systems," *IEEE Transaction on Energy Conversion*, Vol. 9, No. 4, (1994) pp. 760-769.
52. Friedman, Eric J. and Shmuel S. Oren, "The Complexity of Resource Allocation and Price Mechanisms under Bounded Rationality," *Economic Theory*, Vol. 6, (1995) pp. 225-250 .
53. Min, K. Jo and Shmuel S. Oren, "Economic Determination of Spec. Levels and Allocation Priorities of Semiconductor Products," *IIE Transactions*, Vol 27, (1995) pp. 321-331.
54. Oren, Shmuel S., Pablo T. Spiller, Pravin Varaiya and Felix Wu, "Nodal Prices and Transmission Rights: A Critical Appraisal," *Electricity Journal*, Vol. 8, No. 3, (April 1995) pp. 24-35.
55. Bushnell, James B. and Shmuel S. Oren, "Internal Auctions for Efficient Sourcing of

Intermediate Products," *Journal of Operations Management*, " Vol. 12 No. 3-4 ( June 1995) pp. 311-320.

- 56 Arbel Ami and Shmuel S. Oren, "Using Approximate Gradients in Developing an Interactive Interior Primal-Dual Multiobjective Linear Programming Algorithm", *European Journal of Operational Research* Vol. 89 (1996) pp. 202-211
- 57 Wu, Felix, Pravin Variya, Pablo T. Spiller and Shmuel S. Oren, "Folk Theorems on Transmission Open Access: Proofs and Counter Examples", *Journal of Regulatory Economics*, Vol. 10, (July 1996), pp. 5-23
- 58 Oren Shmuel S., "Economic Inefficiency of Passive Transmission Rights in Congested Electricity Systems with Competitive Generation", *Energy Journal*, Vol. 18, No.1 (1997) pp. 63-83.
- 59 Johnson B. Raymond, Shmuel S. Oren, Alva J. Svoboda, "Equity and Efficiency of Unit Commitment in Competitive Electricity Markets.", *Utilities Policy*, Vol. 6. No. 1, (1997) pp.9-19
- 60 Tseng Chung-Li, Shmuel S. Oren, Alva J. Svoboda, Raymond B. Johnson, "A Unit Decommitment Method in Power System Scheduling," *Electrical Power & Energy Systems*, Vol. 19, No. 6, (1997) pp. 357-365
- 61 Oren Shmuel S. "Passive Transmission Rights Will Not Do The Job", *Electricity Journal*, Vol. 10, No. 5, (June 1997) pp. 22-33.
- 62 Bushnell James B. and Shmuel S. Oren, "Transmission Pricing in California's Proposed Electricity market", *Utilities Policy*, Vol. 6, No. 3 (1997) pp. 237-244.
- 63 Tseng Cung-Li, Shmuel S. Oren, Alva J. Svoboda and Raymond B. Johnson, "Price Based Adaptive Spinning Reserves Requirements in Power System Scheduling", *Electrical Power and Energy Systems*, 21 (1999), pp. 137-145
- 64 Tseng Cung-Li, Shmuel S. Oren, Carol S. Chang, Chao-an Li, Alva J. Svoboda and Raymond B. Johnson, "A Transmission-Constrained Unit Commitment Method in Power System Scheduling", *Decision Support Systems*, 24 (1999), pp. 297-310 also in Proceeding of the 31st Hawaii International Conference on Systems Sciences, **Best Paper Award Winner** (January 1998)
- 65 Elmaghrabi Wedad and Shmuel S. Oren, "Efficiency of Multi-Unit Electricity Auctions", *Energy Journal*, 20, (1999) 4, pp. 89-115. Also in Proceedings of the IAEE Conference, San Francisco, California, (September 1997) pp. 458-462.
- 66 Ugarte Armando and Shmuel Oren "Coordination of Internal Supply Chains in Vertically Integrated High-tech Manufacturing Organizations (HTMOs)" *International Journal of Production V* 67 (2000) pp. 235-252
- 67 Tseng Cung-Li, Chao-an Li, and Shmuel S. Oren, "Solving Unit Commitment by a Unit decommitment Method", *Journal of Optimization Theory and* vol. 105,

- 68 Oren Shmuel S., "Integrating real and financial options in demand-side electricity contracts", *Decision Support Systems*, V 30, (2001) 279-288 Also in Proceedings of the 32nd Hawaii International Conference on Systems Sciences, Maui, Hawaii (January, 1999)
- 69 Chao, Hung-po, Stephen Peck, Shmuel Oren and Robert Wilson, "Flow-based Transmission Rights and Congestion Management", *Electricity Journal*, (October, 2000)
- 70 Deng, Shijie and Shmuel S. Oren. "Priority Network Access Pricing for Electric Power *Journal of Regulatory Economics* (In press 2001)
- 71 Kamat, Rajnish and Shmuel S. Oren. "Exotic Options for Interruptible Electricity Supply Contracts" *Journal of Operations Research* (accepted for publication February 2001)

**B. Conference and Symposium Proceedings and Book Chapters:**

- 72 Oren, Shmuel S. and David G. Luenberger, "The Self-Scaling Variable Metric Algorithm," Proceeding of the 5th Hawaii Conference on System Science (January 1972).
- 73 Oren, Shmuel S., "Self-Scaling Variable Metric Algorithms without Line-Search for Unconstrained Minimization," Proceedings of the Joint Automatic Control Conference, Columbus, Ohio (June 1973).
- 74 Oren, Shmuel S., "A Mathematical Model of Computer Assisted Document Creation," in Information Systems, COIN IV, (J. Tou, ed.), Plenum Publishing Corp. (1974), pp. 387-401.
- 75 Oren, Shmuel S., "A Combined Variable Metric-Conjugate Gradient Algorithm for a Class of Large Scale Unconstrained Minimization Problems," in Optimization Techniques: Part 2 (J. Stoer, ed.), Springer-Verlag (1978), pp. 97-115.
- 76 Oren, Shmuel S., "Quasi-Newton Algorithms: Approaches and Motivations," Proceedings of the IEEE Conference on Decision and Control, San Diego, CA (Dec 1973).
- 77 Oren, Shmuel S. and Michael H. Rothkopf, "Optimal Bidding in Sequential Auctions," Proceedings of the IEEE Conference on Decision and Control, Phoenix, AZ (November 1974).
- 78 Oren, Shmuel S., Michael H. Rothkopf and Richard D. Smallwood, "Evaluating a New Market: A Forecasting System for Nonimpact Computer Printers," Proceedings of the First ORSA/TIMS Special Interest Conference on Market Measurement and Analysis, Stanford University (June 1980).
- 79 Oren, Shmuel S. and Stephen A. Smith, "Nonlinear Pricing and Network Externalities in Telecommunications," Proceedings of the 6th International Conference on Computer

Communications, London, U.K. (September 1982).

- 80 Chao, Hung Po, Shmuel S. Oren, Stephen A. Smith and Robert B. Wilson, "Priority Service: Managing Risk by Unbundling Electric Power Service," Proceedings of the XIII Energy Technology Conference, Washington, D.C., pp. 1610-1618 (March 1986).
- 81 Arbel, Ami and Shmuel S. Oren, "A Priority Based Interactive Multicriteria Optimization Algorithm," in Lecture Notes in Economics and Mathematical System Theory, Springer-Verlag, V. 285 (Part I) pp. 163-171, (1987) (Proceedings of the VII-th International Conference on Multiple Criteria Decision Making held in Kyoto, Japan, Aug. 1986).
- 82 Schwartz, Rick G., Shmuel S. Oren, Charles A. Dennis and Robert F. Debusk, "Measuring and Responding to Consumer Preferences for Medical Products and Services," Proceedings of the 1987 Annual Healthcare Systems Conference held in Las Vegas, Nevada (February 1987). (Best paper award).
- 83 Schwartz, Rick G. and Shmuel S. Oren, "Using Analytic Hierarchies for Consumer Research and Market Modeling," in Proceedings of the Sixth Int'l Conference on Mathematical Modeling in Science and Technology," St. Louis, MO., pp. 229-240, (August 1987).
- 84 Min, K. Jo and Shmuel S. Oren, "Optimal Pricing of Allocation Priority and Spec. Level With Multiple Customer Groups," Proceedings of the 1993 NSF Design and Manufacturing Systems Conference, V. 2 (1993), pp. 1799-1808.
- 85 Bushnell, James B. and Shmuel S. Oren, "Two-dimensional Auctions for Efficient Franchising of Independent Power Generation" Proceedings of the 29th Annual Conference of the Operational Research Society of New Zealand, Auckland University, New Zealand, (August 1993).
- 86 Min, K. Jo and Shmuel S. Oren, "Optimal Pricing of Allocation Priority and Spec. Level With Multiple Customer Groups," Proceedings of the 1994 NSF Design and Manufacturing Systems Conference, V. 3 (1994), pp. 351-352.
- 87 Oren Shmuel S. "The Role of Financial Instruments in a Competitive Electricity Market" in Proceedings of the 1996 EPRI Conference on Innovative Approaches to Electricity Pricing, (March 1996) pp. 7:1-15.
- 88 Oren Shmuel S., "Economic Foundation of Unbundling and Product Differentiation with Application to Electric Power" in Proceedings of the NSF Conference on Unbundled Power Quality Services in the Electricity Power Industry, Key-west, Florida, (November 1997) pp. 138-143
- 89 Oren Shmuel S., Alva J. Svoboda and Raymond B. Johnson, "Volatility of Unit Commitment in Competitive Electricity Markets, " in Proceedings of the 30th Hawaii International Conference on Systems Sciences, (January 1997) pp. 594-601
- 90 Oren Shmuel S. and Dennis Ray, "Services in an Unbundled and Open Electric Services Market Place" In The Virtual Utility: Accounting, Technology & Competitive Aspects of

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- 92 Oren Shmuel S., "Transmission Pricing and Congestion Management", Proceedings of the EPRI Conference on Innovative Pricing, Washington DC, (June 17-19, 1998)
- 93 Oren Shmuel S. "Authority and Responsibility of The ISO: Objectives, Options and Tradeoffs", In Designing Competitive Electricity Markets, Chao and Huntington ed., Kluwer Academic Publishers, Boston. (1999).
- 94 Oren Shmuel S. Contributor to: "Unlocking the Benefits of Restructuring: A Blueprint for Transmission" by Shimon Awerbuch, Leonard Hyman and Andrew Vesey, Public Utilities Reports Inc. , (Nov. 1999. )
- 95 Oren Shmuel S., "Capacity Payments and Generation Adequacy in Competitive Electricity Markets", in Proceedings of SEPOPE IIV Conference, Curitiba, Brazil May 22-26, 2000.
- 96 Oren Shmuel S. , "Design of Ancillary Service Markets", Proceeding of the 34<sup>th</sup> Hawaii International Conference on Systems Sciences HICSS 34. Maui, Hawaii, January 5-8, 2001.

### **C. Books**

- 97 Oren, Shmuel S. and Stephen A. Smith, (Editors) "Service Opportunities for Electric Utilities: Creating Differentiated Products," Kluwer Academic Publishers, Boston (1993).

## **II. NON-REFEREED PUBLICATIONS**

### **A. Technical Reports, Working Papers, Comments:**

1. Oren, Shmuel S. "The Correspondence Principle in Viscoelastic Stress Analysis," M. Sc. Thesis, Dept. of Materials Engineering, Technion University, Haifa, Israel (in Hebrew) (July 1969).
2. Oren, Shmuel S. "Self-Scaling Variable Metric Algorithms for Unconstrained Minimization," Ph.D. Thesis, Dept of Engrg-Economics Systems, Stanford University, Stanford, CA (1972).
3. Allan, Dan, Shmuel S. Oren et. al, "A Nationwide Communication System for the Hearing Impaired: Strategies Toward Commercial Implementation," Final Report, Project 3288, SRI International, Menlo Park, California (October 1981).

4. Oren, Shmuel S., Stephen A. Smith and Robert B. Wilson, "Priority Service: Unbundling the Quality Attributes of Electric Power," EPRI Report EA-4871 (Nov. 1986).
5. Oren, Shmuel S., Stephen A. Smith and Robert B. Wilson, "Selected Papers on Priority Service Methods," EPRI Report P-5350, (August 1987).
6. Oren, Shmuel S., "Product Differentiation in Service Industries," working paper presented at the First Annual Conference on Pricing, New York, NY (December 1987).
7. Oren, Shmuel S., Stephen A. Smith and Robert B. Wilson, "Service Design in The Electric Power Industry," EPRI Report P-6543, (1990).
9. Tseng Cung-Li, Chao-an Li, and Shmuel S. Oren, "Solving Unit Commitment by a Unit decommitment Method", POWER Report PWP046, University of California Energy Institute (February 1997),
10. Letter to the Editor, Wall Street Journal, (April 21, 1997)
11. Interview in "Electricity's Big Bang", Public Utilities Fortnightly, (January 1, 1998)
12. Shmuel Oren "It takes One Counterexample to Disprove a Theory", *Electricity Journal*, (10) pp. 95-98, (October 1997)
13. Oren, Shmuel S. and Andrew M. Ross. "Economic Congestion Relief Across Multiple Regions Requires Tradable Physical Flow-gate Rights" POWER Report **PWP-076** , University of California Energy Institute (May 2000)
14. Deng, Shijie and Shmuel S. Oren. "Priority Network Access Pricing for Electric Power (Dec 1999 revision) " POWER Report **PWP-072**, University of California Energy Institute (February 2000)
15. Kamat, Rajnish and Shmuel S. Oren. "Exotic Options for Interruptible Electricity Supply Contracts" POWER Report PWP-071, University of California Energy Institute (February 2000)
16. Oren, Shmuel S. "Review of MAE rules for the Brazilian wholesale electricity market", Report to ANEEL - The Brazilian Electricity Regulatory Agency (June 15, 2000)
17. Wilson, Ami, J. Kahn and Shmuel Oren, "Targeting Interventions to Prevent Human Immunodeficiency Virus (HIV) in Injection drug Users (IDUs), Working Paper, (August 2000)
18. Oren Shmuel S. and Pablo Spiller, "Wild Prices Out West: What Can Be Done", Public Utilities Fortnightly, November 1, 2000, pp. 58-61.
19. Kamat, Rajnish and Shmuel S. Oren. "Rational Buyer Meets Rational Seller: Reserves Markets Equilibrium Under Alternative Auction Design, Working Paper (November 5, 2000)



20. J. Rabaey, E Arans, C. Dedespeil, A. Gadgill, D Masserschmidt, W. Nazaroff, K. Pister, S. Oren "Smart Energy Distribution and Consumption: Information Technology as an Enabling Force", CITRIS White Paper, University of California at Berkeley (May 2001)

## SELECTED PROFESSIONAL ACTIVITIES:

### Public Service:

- Member of Technical Advisory Panel for the Mayor's Blue Ribbon Committee on Water Rates, City of Los Angeles, (1992-93)
- Testimony on Electricity Restructuring before the California Public Utility Commission (1996)
- Consulting to the Brazilian Electricity Regulatory Agency on the Brazilian Wholesale Electricity Market rules (June 2000).
- Consulting to the Texas Public Utility Commission on the design of ERCOT ancillary service market (July 2000)
- Panel Member for the National Science Foundation SBIR (August 2000)
- Invited speaker and panel moderator at a White House OSTP/NSF workshop on Critical Infrastructure Research (June 2001)
- Consultant to the Alberta Energy Utility Board on evaluation of the Alberta Electricity Market (June-September, 2001)
- External evaluation of the Polish electricity market (July-September, 2001)

### Doctoral Students and Theses

- 1 Adam Borison "Optimal Electric Utility Generation Expansion Under Uncertainty", 1982
- 2 Avshalom Horan-Hecker, "Air Defense Strategies by Differential Games", 1982
- 3 Stephen Powel, "The Transition to Nondepletable Energy", 1983
- 4 Anirudh Dhebar, "Dynamic Nonlinear Pricing in Markets with Positive Demand Externalities", 1983
- 5 Robert Phillips, "Solving Generalized Equilibrium Models", 1985
- 6 Rick Schwarts, "The Adoption and Diffusion of Technical Innovation", 1985
- 7 Kyung Keun Lee, "Inventory Management by Nonlinear Order Quantity Pricing", 1987
- 8 Joseph Doucet "Differential Pricing of Electricity Through Interruption Insurance", 1988
- 9 David Wood "A Study of Multiplicative Strategy Equilibria in Second-Price Multi-component Auctions", 1989
- 10 Jo Kyung Min, "Pricing Delivery and Spec. Level of Custom Semiconductor Chips", 1989
- 11 David Braden, "Nonlinear Pricing to Reduce Demand Uncertainty", 1989
- 12 Todd Strauss, "Interruptible Electricity Tariffs with Early Notification", 1992
- 13 Alva Svoboda "Simulation of Dispatchable Demand-side Management in Electric Power System Operation Planning", 1992
- 14 Eric Friedman "Topics in Coordination and Decentralization", 1993
- 15 James Bushnell, "Multi-Dimensional Revelation in Auctions for Electric Power Supply", 1993
- 16 Armando Ugarte, "Coordination Mechanisms for High-Tech Manufacturing Organizations", 1995
- 17 Chung-Li Tseng, "On Power System Generation Unit Commitment Problems", 1996
- 18 Wedad Elmaghraby "Multi-unit Auctions for Electric Power with Nonconvex Costs", 1998
- 19 Shijie Deng "Financial Methods in Deregulated Electricity Markets", 1999
- 20 Ami Beth Craft "Market Structure and Capacity Expansion in an Unbundled Electric Power Industry" (Co-chaired), 1999
- 21 Ami Wilson "The Multiple Intervention Problem: An Application to Preventing Human Immunodeficiency Virus in Injection Drug Users", 2000
- 22 Rajnish Kamat, "Topics in Market Design for Competitive Electricity", (in progress)
- 23 Afzal Siddiqi "Equilibrium Analysis of Spot and Forward Markets for Energy and Reserves" (in progress)

### **Public lectures, Seminars and Conference Activities (since November 1992)**

- ORSA/TIMS National Meeting, San Francisco, CA. "Incentive Compatible Scoring Rules for Electric Power Auctions, (with Bushnell), November 1992
- ORSA/TIMS National Meeting, San Francisco, CA. "A Polynomial Algorithm for Resource Allocation", (with Friedman) November 1992
- ORSA/TIMS National Meeting, San Francisco, CA. "Pricing Specification Levels and Allocation Priorities for Semiconductor Products", (with Min), November 1992
- ORSA/TIMS National Meeting, San Francisco, CA. "Generating Interior Search Directions for Multiobjective Linear Programming, (with Arbel) November 1992
- ORSA/TIMS National Meeting, San Francisco, CA. "Alternative Methods for Decision Aiding", Panel member. November 1992.
- Tel Aviv University, School of Business Administration, "Bidder Cost Revelation in Two Dimensional Auctions," January 1993.
- Israel Electric Power Company, "Auctions for Electric Power Acquisition from Independent Producers", January 1993.
- Stanford University, EES Dept. Silver Symposium, "Efficient Coordination Through Market Mechanisms", March 1993.
- UC Berkeley Workshop on Keeping California Industry Competitive and Green, "Market Mechanisms for Environmental Regulation," May 1993.
- IFORS Conference, Lisbon, Portugal, "Let the Data Do the Talking", July 1993.
- School of Electrical Engineering, University of New South Wales, Sidney Australia, "Efficient Coordination Through Market Mechanisms", August 1993.
- 29<sup>th</sup> Annual Conference of the Operations Research Society of New Zealand, "Two-dimensional Auctions for Efficient Franchising of Independent Power Generation", August 1993.
- Department of Management, University of Canterbury, Christchurch, New Zealand, A five lecture series on Pricing, September-October, 1993.
- Electric Corporation of New Zealand, Wellington, New Zealand, "Product Differentiation and Pricing in the Electric Power Industry", October 1993
- Management Foundation of the University of Canterbury, Christchurch, New Zealand, "Product Differentiation and Pricing in the Electric Power Industry", October 1993.
- ORSA/TIMS meeting, Boston, Mass. "Two-dimensional Auctions for Efficient Franchising of Public Monopolies", April 1994
- International TIMS meeting, Anchorage, Alaska, "Incentives Effects of Environmental Adders in Electric Power Auctions," (with Bushnell), June 1994.
- INFORMS meeting, Los Angeles, CA., "Coordination Mechanisms for HiTec. Manufacturing Organizations," (with Ugarte). April 1995
- Conference on Technological Foundation for Customer Choice in the Electric Power Industry, Washington, DC. "PoolCo, Bilateral and Other Restructuring Alternatives," (with Wu). June 1995
- International INFORMS meeting, Singapore, "Electricity Forwards with Double Call Options," June 1995.
- 18<sup>th</sup> IAEE International Conference, Washington DC. "Nodal Prices and Transmission Rights: A Critical Appraisal", July 1995.
- International Symposium in Regulation and Industrial Organization: Transition from Regulation to Competition in Network Industries. "Nodal Prices and Transmission Rights: a Critical Appraisal" (With Pablo Spiller, Pravin Varaiya and Felix Wu), October 1995
- INFORMS meeting, New Orleans. "Nodal Prices and Transmission Rights: a Critical Appraisal" (With Pablo Spiller, Pravin Varaiya and Felix Wu), October 1995.
- INFORMS meeting, New Orleans. "Internal Auction for Efficient Sourcing of Intermediate Products" (With James Bushnell), October 1995.
- EMF 15 Working Group Meeting on A competitive Electricity Industry, Palo Alto CA. Panel member, November 1995.
- Allied Social Science Association Annual Meeting, San Francisco, CA "Policy Implications of Technologically-Induced Market Failure in Electric Power Networks", January 1996.
- University of California Energy Institute - POWER Symposium on Electricity Industry Restructuring "Equity and Efficiency of Unit Commitment in Competitive Electricity Markets" (with Raymond Johnson and Alva Svoboda), March 1996

- 1996 EPRI Conference on Innovative Approaches to Electricity Pricing, San Diego CA. "The Role of Financial Instruments in a Competitive Electricity Market", March 1996.
- Symposium on The Virtual Utility, Saratoga Springs, NY. "Services in an Unbundled and Open Electric Services Market Place" (with Dennis Ray), March 1996
- Lawrence Berkeley Laboratory Informatics Workshop, Berkeley CA. "Utility Operations Algorithms", April 1996.
- EPRI Workshop on: Underlying Technical Issues in Utility Deregulation, Tucson, Arizona. Panel member. April 1996.
- INFORMS meeting, Washington DC. "Market-Based Coordination of a Competitive Electricity System: Myths and Realities", May 1996.
- NSF I/UCRC Planning Meeting, University of Wisconsin. "Market Mechanisms for a Competitive Electricity Market", May 1996
- EMF 15 Working Group Meeting on A competitive Electricity Industry, Washington DC. "Equity and Efficiency of Unit Commitment in Competitive Electricity Markets", June 1996.
- Invited Lecture to the Division of Ratepayers Advocates of the CPUC "Market Engineering for Competitive Electricity", June 1996.
- NSF Conference on Unbundled Power Quality Services in the Electricity Power Industry, Key-west, Florida. "Economic Foundation of Unbundling and Product Differentiation with Application to Electric Power" November 1996
- 30<sup>th</sup> Hawaii International Conference on Systems Sciences, Maui, Hawaii, "Volatility of Unit Commitment in Competitive Electricity Markets," January, 1997
- Berkeley, POWER Conference on Electricity Restructuring, organized by the University of California Energy Institute, March 97.
- Invited participation at NSF ITO Grantee Workshop, April 1997
- INFORMS Conference, San Diego CA. "A Multi-round Load-slice Auction for Electric Power", May 1997.
- Workshop organized by Technical University of Krakow and the Polish Institute for Energy Efficiency, Krakow, Poland.: "Alternative Market Structures for Competitive Electricity", June, 1997
- EURO/INFORMS Conference, Barcelona, "Load Slice Auctions for Electric Power" July 1997.
- Electrabel (Belgian electric utility), Brussels, Belgium "Alternative Market Structures for Competitive Electricity", July 1997.
- IAEE Conference, San Francisco, California, "Efficiency of Multi-Unit Electricity Auctions", (with Elmaghrabi) September, 1997.
- IAEE Conference, San Francisco, California, "Priority Network Access Pricing for Electric Power," (with Deng), September 1997.
- 31<sup>st</sup> Hawaii International Conference on Systems Sciences, "A Transmission-Constrained Unit Commitment Method", January 1998, **Best Paper Award Winner**
- POWER Conference, University of California Energy Institute, Berkeley, California "Priority Network Access Pricing for Electric Power," (with Deng), March 1998.
- Stanford EMF15 semiannual meeting on Electricity Restructuring on "Priority Network Access Pricing for Electric Power" May 12, 1998
- Testimony before FERC on "Authority and Responsibility of the ISO", FEC hearing Portland, Oregon, June 5, 1998.
- PSERC Industry Advisory Board Meeting, Montreal, Canada, June 14-16, 1998
- EPRI Conference on Innovative Pricing, "Transmission Pricing and Congestion: Efficiency Simplicity and Open Access", June 17-19, 1998.
- Polish Grid Company, "The California Competitive Electricity Market", Warsaw, Poland June 23, 1998.
- FEWE (Polish Energy Efficiency Institute), "The California Competitive Electricity Market", Krakow, Poland June 24, 1998.
- International INFORM Conference, Tel Aviv, Israel, Cluster Chair for Energy Track
- International INFORM Conference, Tel Aviv, Israel, Session Chair and Invited lecture "An Option Pricing Approach to Network Access Pricing for Electric Power" (joint paper with S. Deng), June 28-July 1, 1998.
- 11th Annual Western Conference: Advanced Workshop in Regulation and Competition, Monterey, California, "An Illusory Market for Load Profile Pricing" (with HP Chao), July 9, 1998
- PSERC annual retreat, Del Mar, California, July 10-12, 1998.
- Rate Payers Advocates Division of the CPUC, "Alternative Congestion Management Approaches for the ISO", July 15, 1998.

- Bulk Power Systems Dynamics and Control Conference IV - Restructuring, Santorini, Greece, "Priority Network Access Pricing For Electric Power", (joint paper with S. Deng), August 24-28, 1998.
- NSF workshop on Frontiers in Electronic Commerce, University of Texas, Austin, invited panel member, September 10-12, 1998.
- INFORM meeting, Seattle, WA - Organized and Chaired session on "Auctions in a Deregulated Electricity Market", October 25-28, 1998.
- INFORM meeting, Seattle, WA - member of panel on "Building Relationships between Universities, Business and Government", October 25-28, 1998.
- INFORM meeting, Seattle, WA - member of panel on "Do Management Scientists and Economists Think about Auctions Differently", October 25-28, 1998.
- Joint US-Japan Workshop on Intelligent Manufacturing - Invited presentation "Interior Point approaches to Multi-Objective Linear Optimization", Ashikaga, Japan, November 10-12, 1998.
- Joint Japan-Australia Workshop on Intelligent and Evolutionary Systems - Invited presentation "Interior Point approaches to Multi Objective Linear Optimization", Kyoto, Japan, November 12-14, 1998.
- NEPOOL Congestion Management Subcommittee - Presentation on Congestion Management and Transmission Rights, December, 3, 1998.
- PSERC Industry Advisory Board Meeting - Progress report presentation on Market Mechanism Project, Washington State University, December 10-11, 1998.
- 32<sup>nd</sup> Hawaii International Conference on Systems Sciences - Organized and chaired session on "Financial Risk Management Approaches in Competitive Electricity Markets", January 5-8, 1999.
- 32<sup>nd</sup> Hawaii International Conference on Systems Sciences - Invited presentation "Combining Financial Double Call Options with Real Options for Early Curtailment of Electricity Service, January 5-8, 1999.
- Stanford EMF17 semiannual meeting on Electricity Restructuring - Panel member, Stanford, January 28-29, 1999.
- Haas Business School, Berkeley - Gether Seminar in Marketing: "Electricity Pricing", February 26, 1999.
- Workshop on Coordination in Deregulated Industry - Invited presentation: "Integrating Real and Financial Options in Demand Side Electricity Contracts", Organized by Helsinki University of Technology, Ivalo, Finland, March 21-25, 1999.
- Workshop on planning and operation of electric power systems organized by the Colombian Electricity Regulatory Commission and the University of the Andes: Invited presentation on "Alternative Approaches to Congestion Management in Competitive Electricity Markets", Bogotá, Colombia, May 13-14, 1999
- Special Conference on Capacity Payments in Competitive Electricity Markets organized by the Spanish regulatory Commission: Invited as one of the five speakers on "Assuring generation adequacy in competitive electricity markets", Madrid, Spain June 7-8, 1999
- PSERC Industry Advisory Board Meeting - Progress report presentation on Market Mechanism Project, University of Wisconsin, June 25-26, 1999
- Workshop on Electricity Restructuring at UNICAMP university for Brazilian regulator and industry: Invited as lead speaker (12 hours of lectures), Sao Paulo, Brazil, June 29-July 2, 1999
- ONS (Brazilian Independent System Operator): Invited lecture on "The California electricity reform", Rio de Janeiro, Brazil, July 5, 1999
- CEPEL (Electrobrass research center on electric power): Invited lecture on "Financial engineering methods in electric power planning", Rio de Janeiro, Brazil, July 6, 1999.
- MAE Brazilian Wholesale Electricity Market: Invited lecture on "The California electricity reform", Sao Paulo, Brazil, July 7, 1999.
- EPRI/Stanford workshop on Planning Under Uncertainty: Invited talk "Incorporating physical constraints in option-based valuation of generation capacity" (with Deng), Palo Alto, California, July 12-16, 1999.
- IFORS meeting, Beijing: Organized three sessions on Competitive Electricity.
- IFORS meeting, Beijing, "Incorporating physical constraints in option-based valuation of generation capacity" (with Deng), August 16-20, 1999.
- EES-UETP workshop on Electric Reliability Under Restructuring at IIT, Madrid: Invited talk, "Congestion Management and Transmission Pricing", October 6-9, 1999.
- Workshop on Environmental Implications of Competitive Electricity, University of Krakow, Poland: Invited lecture, "Congestion Management and Transmission Pricing", October 11-14, 1999.
- PSERC Industry Advisory Board Meeting - Progress report presentation on Market Mechanism Project, TVA, Chattanooga, October 28-29, 1999
- Stanford EMF17 semiannual meeting on Electricity Restructuring - Panel member, Washington DC, November 4-5, 1999.

- INFORMS meeting, Philadelphia, PA: Organized session on Valuation of Real Options in Competitive Electricity Markets, November 7-10, 1999.
- INFORMS meeting, Philadelphia, PA: "Incorporating physical constraints in option-based valuation of generation capacity" (with Deng), November 7-10, 1999.
- INFORMS meeting, Philadelphia, PA: "Ensuring Generation Adequacy in Competitive Electricity Markets November 7-10, 1999.
- EDF, French Electric Power Comp.: Invited workshop on market design and the California electricity market., Paris, France, December 15, 1999.
- Univ. Castilla - La Mancha, Ciudad Real, Spain: Invited seminar "Capacity Payments and Generation Adequacy in Competitive Electricity Markets", December 15, 1999.
- IEA (International Energy Agency) Regulatory Forum, Invited lecture "The California Electricity Market", London, UK, March 9-10, 2000
- UCEI annual POWER Conference, Discussant, March 17, 2000.
- EES-UETP workshop on Water and Fuel Management in Competitive Electricity Markets, at IIT, Madrid: Invited talk, "Incorporating Spot Price Information in Water Value Calculation", April 10-13, 2000.
- DOE - CERTS project review: "Designing Ancillary Service Markets", April 27, 2000.
- PSERC Industry Advisory Board Meeting - Progress report presentation on Market Mechanism Project, Iowa State University, May 15-16, 2000
- SEPOPE IIV Conference, Member of Panel on International Market Design Experience, Curitiba, Brazil May 22-26, 2000
- SEPOPE IIV Conference, Invited lecture "Capacity Payments and Generation Adequacy in Competitive Electricity Markets, Curitiba, Brazil May 22-26, 2000.
- Stanford EMF17: Invited lecture "Economic Congestion Relief Across Multiple Regions Require Physical Flowgate Rights", June 1-2, 2000
- ANEEL (Brazilian Electricity Regulatory Agency) workshop on the new rules for the Brazilian wholesale electricity market (MAE): Invited presentations on "Review of MAE pricing" and "Review of MAE capacity payment calculation", Brasília, Brazil, June 14-15, 2000.
- Texas Public Utility Commission - Stakeholders Workshop on Ancillary Service Markets - Invited presentation "Evaluation and proposed modifications of ERCOT ancillary service market protocols", July 7, 2000
- PSERC annual retreat - Presentation of Market Mechanism project status report, Steamboat, Colorado, July 31-August 5, 2000
- EPRI/EMF workshop on Flow-based approaches to congestion management: Invited presentation "TLR Across Multiple Regions and Flowgate Transmission Rights", August 17-20, 2000.
- EEI Workshop on RTOs and Market Design: Invited lecture "Design of Ancillary Service Markets", Washington DC., September 28-29, 2000
- UCEI-POWER seminar, "Rational Buyer Meets Rational Seller and Other Stories", October 20, 2000.
- INFORM Meeting: Organized the ENRI sponsored Energy cluster (seven sessions with 28 paper) San Antonio, TX November 5-8, 2000
- INFORM Meeting: Invited talk "Design of Auctions for Hierarchically Substitutable Ancillary Services", San Antonio, TX November 5-8, 2000
- INFORM Meeting: Invited talk "Pay as Bid Auctions for Ancillary Services" (with Kamat), San Antonio, TX November 5-8, 2000.
- INFORM Meeting: "Flow-Base Transmission Rights and Congestion Management" (with Chao, Peck and Wilson), San Antonio, TX November 5-8, 2000
- PSERC IAB Meeting: Tutorial on "FTRs and Flowgate rights", Colorado School of Mines, November 30, 2000
- HICSS 34: Invited talk "Design of Ancillary Service Market", Maui, Hawaii, January 3-8, 2001.
- IEEE PES Winter Meeting: Panel Speaker "Market Structure, Market Rules and Market Behavior in a Competitive Electricity Industry" January 28-February 1, 2001.
- NSF ENG-SBE Workshop: Invited presentation "Layered Networks and Networked Markets: Challenges to Information Processing and Decision Making", Arlington VA April 5-6, 2001
- Arizona State University, Workshop on the California Energy Crisis: Invited presentation "Ensuring Generation Adequacy in Competitive Electricity Markets", Tucson, Arizona April 13, 2001.
- PSERC IAB Meeting: Member of panel on Challenges to Independent System Operators, Chicago, IL, June 1, 2001
- California Senate office of Research: Invited presentation on the Texas electricity market, Sacramento, CA

June 5, 2001

- White House OSTP/NSF workshop on Critical Infrastructure Research: Moderator of session on Risk Assessment/Economics and presenter of invited talk on "Market Based Risk Mitigation: Risk avoidance vs. Risk Management", Washington DC, June 15, 2001.
- Stanford EMF Conference on Retail Competition in Electricity: Invited talk on "Pricing Interruptible Electricity Supply Contracts: A Real Option Approach", Stanford, CA, June 21-22, 2001
- 14th Annual Western Conference, Invited talk on "Market Design for Competitive Electricity: Experiences, Flaws and Remedies" San Diego, CA, June 27-29, 2001
- IEEE Power Engineering Systems Summer Meeting, "Organized a panel on the California Energy Crisis, Causes and Remedies", Vancouver, Canada, July 15-19, 2001

Updated August, 2001

**Resume of Keith Allen Rogas**  
1701 North Congress Avenue  
P.O. Box 13326  
Austin, Texas 78711-3326  
(512) 936-7277  
Date: July 3, 2002

**Experience**

5/01-Present Director  
12/92-5/01 Attorney  
Electric Section, Legal Division  
Public Utility Commission of Texas  
Austin, Texas  
Serve as a legal and policy expert on electric industry matters, and supervise the work of others on electric industry matters. Represent the public interest in proceedings concerning the electric industry before the Public Utility Commission of Texas, State Office of Administrative Hearings, and Electric Reliability Council of Texas.

1/92-12/92 Associate  
Law Clerk  
Brown McCarroll & Oaks Hartline  
Austin, Texas  
Administrative, environmental, and utility law.

1991 Law Clerk Law Clerk Law Clerk  
Booth & Newsom Brown Maroney & Oaks Hartline Monroe & Lemann  
Austin, Texas Austin, Texas New Orleans, LA

1990 Law Clerk Law Clerk  
Anderson, Smith, Null & Stofer Monroe & Lemann  
Victoria, Texas New Orleans, LA

1986-1989 Electric Utility Specialist  
Public Utility Commission of Texas  
Austin, Texas  
Served as an expert witness on depreciation and engineering matters.

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**Education**

Doctor of Jurisprudence  
The University of Texas at Austin  
Date of graduation: May 1992  
Phi Delta Phi (honorary legal fraternity)

Bachelor of Science in Mechanical Engineering with High Honors  
The University of Texas at Austin  
Date of Graduation: May 1986  
Tau Beta Pi (honorary engineering fraternity)  
Pi Tau Sigma (honorary mechanical engineering fraternity)