

# Ren Orans

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***Dr. Orans founded E3 in 1993. The firm has nationally recognized experts in the fields of transmission and distribution planning, economic and regulatory theory and finance. Dr. Orans heads the litigation support and utility planning practices for E3.***

## **ENERGY & ENVIRONMENTAL ECONOMICS, INC.** ***Managing Partner***

San Francisco, CA  
1993-Present

- Dr. Orans's work in utility planning is centered on the design and use of area and time-specific costs for both pricing and evaluation of grid infrastructure alternatives. The first successful application was conducted for Pacific Gas and Electric Company in their 1993 General Rate Case. Using costs developed by Dr. Orans, PG&E became the first electric utility to use area and time specific costing in its ratemaking process.
- Dr. Orans also used the same data to develop a process called local integrated resource planning (LIRP) using detailed estimates of incremental costs for transmission and distribution planning areas. This work was formalized in his dissertation, *Area-Specific Cost of Electric Utilities: A Case Study of Transmission and Distribution Costs* and his work with the Electric Power Research Institute to document this new LIRP process. This seminal work led to applications in pricing, marketing and planning for Wisconsin Electric Company, Niagara Mohawk Power Company, Public Service of Indiana, Kansas City Power and Light, Central and Southwest Utilities, Central Power and Light, Philadelphia Electric Company, Tennessee Valley Authority and Ontario Hydro.
- Dr. Orans's expertise in utility planning is complimented by his working experience at Pacific Gas and Electric Company, where he was responsible for designing electric rates from 1982 to 1985. He has relied on this background along with his published papers to provide expert testimony on transmission pricing on behalf of BC Hydro (1996, 1997 and 2004), Ontario Power Generation (2000) and Hydro Quebec (2001, 2005, 2008). He has also worked extensively on the formulation of Regional Transmission Organizations (Grid West) in the U. S. Pacific Northwest. His current cases include the development of estimates the cost to comply with California's greenhouse gas compliance law (AB32) for the California PUC and the California Air Resource Board (CARB), and the evaluation of San Diego Gas and Electric's proposed Sunrise 500 KV transmission line on behalf of the California ISO and the evaluation of a new 500 KV transmission line on behalf of Pacific Gas and Electric Company.

## **DEPARTMENT OF ENERGY** **NATIONAL RENEWABLE ENERGY LABORATORY** **ELECTRIC POWER RESEARCH INSTITUTE** ***Lead Consultant***

Washington, DC  
1992-1993

- Developed new models to evaluate small-scale generation and DSM placed optimally in utility transmission and distribution systems.

## **PACIFIC GAS & ELECTRIC COMPANY**

San Francisco, CA

**Research and Development Department**

1989-1991

- Developed an economic evaluation method for distributed generation alternatives. The new approach shows that targeted, circuit-specific, localized generation packages or targeted DSM can in some cases be less costly than larger generation alternatives.
- Developed the evaluation methodology that led to PG&E's installation of a 500KW photovoltaic (PV) facility at their Kerman substation. This is the only PV plant ever designed to defer the need for distribution capacity.

**ELECTRIC POWER RESEARCH INSTITUTE**  
**Consultant**

Palo Alto, CA  
1988-1992

- Developed the first formal economic model capable of integrating DSM into a transmission and distribution plan; the case study plan was used by PG&E for a \$16 million pilot project that was featured on national television.

**DEPARTMENT OF ENERGY**  
**Lead Consultant**

Washington, DC  
1989-1990

- Collaborated on a cooperative research and development project with the People's Republic of China. The final product was a book on lessons learned from electric utility costing and planning in the United States.

**PACIFIC GAS & ELECTRIC COMPANY**  
**Corporate Planning Department**

San Francisco, CA  
1989-1992

- Lead consultant on a joint EPRI and PG&E research project to develop geographic differences in PG&E's cost-of-service for use in the evaluation of capital projects.
- Developed shared savings DSM incentive mechanisms for utilities in California.

**PACIFIC GAS & ELECTRIC COMPANY**  
**Rate Department Economist**

San Francisco, CA  
1981-1985

- Responsible for the technical quality of testimony for all electric rate design filings.
- Responsible for research on customers' behavioral response to conservation and load management programs. The research led to the design and implementation of the first and largest residential time-of-use program in California and a variety of innovative pricing and DSM programs.

Education

**Stanford University**  
**Ph.D., Civil Engineering**

Palo Alto, CA

**Stanford University**  
**M.S., Civil Engineering**

Palo Alto, CA

**University of California**  
**B.S., Economics**

Berkeley, CA

## Citizenship

United States

## Refereed Papers

1. Orans, R., M. King, C.K. Woo and W. Morrow (2009) "Inclining for the Climate: GHG Reduction via Residential Electricity Ratemaking," *Public Utilities Fortnightly*, forthcoming.
2. Olson A., R. Orans, D. Allen, J. Moore, and C.K. Woo (2009) "Renewable Portfolio Standards, Greenhouse Gas Reduction, and Long-line Transmission Investments in the WECC," *Electricity Journal*, forthcoming.
2. Woo, C.K., E. Kollman, R. Orans, S. Price and B. Horii (2008) "Now that California Has AMI, What Can the State Do with It?" *Energy Policy*, 36, 1366-74.
3. Orans, R., S. Price, J. Williams, Woo, C.K., Moore, J. (2007), "A Northern California-British Columbia partnership for renewable energy, *Energy Policy*.
4. Lusztig, C., P. Feldberg, R. Orans and A. Olson (2005) "A survey of transmission tariffs in North America," *Energy-The International Journal*.
4. Woo, C.K., A. Olson and R. Orans (2004), "Benchmarking the Price Reasonableness of an Electricity Tolling Agreement," *Electricity Journal*, 17:5, 65-75.
5. Orans, R., Woo, C.K., Clayton, W. (2004) "Benchmarking the Price Reasonableness of a Long-Term Electricity Contract," *Energy Law Journal*, Volume 25, No. 2.
6. Orans, R., Olson, A., Opatrny, C., *Market Power Mitigation and Energy Limited Resources*, *Electricity Journal*, March, 2003.
7. Chow, R.F., Horii, B., Orans, R. et. al. (1995), *Local Integrated Resource Planning of a Large Load Supply System*, *Canadian Electrical Association*.
8. Feinstein, C., Orans, R. (1995) "The Distributed Utility Concept," *The Annual Energy Review*, 1988.
9. Woo, C.K., R. Orans, B. Horii and P. Chow (1995), "Pareto-Superior Time-of-Use Rate Options for Industrial Firms," *Economics Letters*.
10. Woo, C.K., B. Hobbs, Orans, R. Pupp and B. Horii (1994), "Emission Costs, Customer Bypass and Efficient Pricing of Electricity," *Energy Journal*, 15:3, 43-54.
11. Orans, R., C.K. Woo, R. Pupp and I. Horowitz (1994), "Demand Side Management and Electric Power Exchange," *Resource and Energy Economics*, 16, 243-254.
12. Pupp, R., C.K. Woo, R. Orans, B. Horii, and G. Heffner (1995), "Load Research and Integrated Local T&D Planning," *Energy - The International Journal*, 20:2, 89-94.
13. Woo, C.K., R. Orans, B. Horii, R. Pupp and G. Heffner (1994), "Area- and Time-Specific Marginal Capacity Costs of Electricity Distribution," *Energy - The International Journal*, 19:12, 1213-1218.

14. Orans, R., C.K. Woo and B. Horii (1994), "Targeting Demand Side Management for Electricity Transmission and Distribution Benefits," *Managerial and Decision Economics*, 15, 169-175.
15. Orans, R., C.K. Woo and R.L. Pupp (1994), "Demand Side Management and Electric Power Exchange," *Energy - The International Journal*, 19:1, 63-66.
16. Orans, R., Seeto, D., and Fairchild, W., (1985), "The Evolution of TOU Rates," Pergamon Press.

## Research Reports

1. CPUC, (2009), "33% Renewable Portfolio Standard, Implementation Analysis Preliminary Results," Prepared by the California Public Utilities Commission with technical assistance from Energy and Environmental Economics, Inc. (Orans, R., Olson, A., Mahone, A. and Allen, D.)  
<http://www.cpuc.ca.gov/NR/rdonlyres/1865C207-FEB5-43CF-99EB-A212B78467F6/0/33PercentRPSImplementationAnalysisInterimReport.pdf>
2. Price, S., Orans, R., (2008), "Electricity and Natural Gas GHG Modeling, Revised Results and Sensitivities," Prepared for the California Public Utilities Commission.  
[http://www.ethree.com/GHG/E3\\_CPUC\\_GHGResults\\_13May08%20\(2\).pdf](http://www.ethree.com/GHG/E3_CPUC_GHGResults_13May08%20(2).pdf)
3. Orans, R. Olson, A., *Integrated Resource Plan for Lower Valley Energy*, December, 2004.
4. Orans, R., Woo C.K., and Olsen, Arne, *Stepped Rates Report*, prepared for BC Hydro and filed with the BCUC, May, 2003.
5. Orans, R., Woo, C.K, and B. Horii (1995), *Impact of Market Structure and Pricing Options on Customers' Bills*, Report submitted to B.C. Hydro.
6. Horii, B., Orans, R., Woo, C.K., (1994) *Marginal Cost Disaggregation Study*, Report submitted to PSI Energy.
7. Woo, C.K., L. Woo and R. Orans (1995), *Rationing and Area-Specific Generation Costs*, Report submitted to Pacific Gas and Electric Company.
8. Orans, R., C.K. Woo and C. Greenwell (1994), *Designing Profitable Rate Options Using Area- and Time-Specific Costs*, Report No. TR-104375, Electric Power Research Institute.
9. Singer, J., Orans, R., *Energy Efficiency Lending, A Business Opportunity for Fannie Mae*, Report submitted to Fannie Mae.
10. Orans, R., Feinstein, C. et. al., (1993), *Distributed Utility Valuation Study*, submitted to the Electric Power Research Institute, the National Renewable Energy Laboratory, and PG&E.
11. Orans, R., Pupp, R., (1993), *Menomonee Falls Case Study*, Submitted to Wisconsin Electric Power Corporation.
12. Orans, R. and C.K. Woo (1992), *Marginal Cost Disaggregation Study*, Report submitted to Wisconsin Electric Power Corporation.
13. Orans, R., C.K. Woo, J.N. Swisher, B. Wiersma and B. Horii (1992), *Targeting DSM for Transmission and Distribution Benefits: A Case Study of PG&E's Delta District*, Report No. TR-100487, Electric Power Research Institute.

14. Orans, R., Swisher, J., Duane, T., (1989), *Lessons Learned from U.S. Electric Utilities, Prepared for the Department of Energy for the Peoples Republic of China.*
15. Orans, R., *Area-Specific Marginal Costing for Electric Utilities: A Case Study of Transmission and Distribution Costs (1989) PhD Thesis, Stanford University.*
16. Orans, R., (1987)*The Risk of Sales Forecasts: Controllable through Indexation and Careful Disaggregation, Submitted to Stanford University and Pacific Gas and Electric Company.*
17. Woo, C.K. and R. Orans (1983), *Transferability of Other Utilities' Time of Use Experiments to PG&E's Service Schedule D-7, Pacific Gas and Electric Company Reports filed with the California Public Utilities Commission.*

## Conference Papers and Presentations

1. Orans, R., (2008), "Achieving CO2 Reductions in the Electricity Sector: Short Term and Long Term Goals," Prepared for Law Seminars International's Energy in California Conference and presented in San Francisco.
2. Orans, R., Olson, A., (2008) "Load-Resource Balance in the Western Interconnection : Towards 2020," Working Product for the Western Electric Industry Leaders (WEIL) Group. [http://www.weilgroup.org/E3\\_WEIL\\_Complete\\_Study\\_2008\\_082508.pdf](http://www.weilgroup.org/E3_WEIL_Complete_Study_2008_082508.pdf)
3. Orans, R. ( 2004), "Evaluating Generating Resources based on a Equivalent Reliability Methodology", 2<sup>nd</sup> Annual Resource Planning Symposium, Vancouver, Canada.
4. Martin, J., Orans, R., Knapp, K., (2000), "DG Economics and Distribution Rate Design" Western Electric Power Institute, Distributed Generation and the Utility Distribution System Conference, March 22-23, Reno, NV.
5. Orans, R. (1997), "Getting the Transmission Prices Right," Facilitating Cross Border Trade, New Mexico.
6. Orans, R. (1997), "Deregulation on the Mainland, What is Happening and What is Not", PCEA Conference, Hawaii.
7. Swisher, J., Orans, R., (1995), "A New Utility DSM Strategy Using Intensive Campaigns Based on Area Specific Costs," ECEEE 1995 Summer Study.
8. Orans, R., Greenwell, C., (1995), "Designing Profitable Rate Options Using Area and Time-Specific Costs," Prepared for EPRI, Annual DSM Review, Dallas, Texas.
9. Orans, R. (1995), "Integrated Local Area Planning", Prepared for NELPA and presented in Calgary.
10. Orans, R., "Local Area Planning for Profit", " Prepared for EPRI's Annual Review of Distributed Resource Studies, Lake George, New York.
11. Orans, R., C.K. Woo, B. Horii and R. Pupp, (1994), "Estimation and Applications of Area- and Time-Specific Marginal Capacity Costs," Proceedings: 1994 Innovative Electricity Pricing, (February 9-11, Tampa, Florida) Electric Research Power Institute, Report TR-103629, 306-315.