PUC DOCKET NO. 31540

DIRECT TESTIMONY OF

DR. FRANK WOLAK

ON BEHALF OF
DENTON MUNICIPAL ELECTRIC

NOVEMBER 2005
DIRECT TESTIMONY OF DR. FRANK WOLAK

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I. STATEMENT OF QUALIFICATIONS

Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.

A. My name is Frank A. Wolak. I am a Professor of Economics at Stanford University. My business address is Department of Economics, Stanford University, Stanford, CA 94305-6072.

Q. PLEASE BRIEFLY OUTLINE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I began my work on energy and environmental issues at the Los Alamos National Laboratory (LANL) in 1980. The following year I entered graduate school at Harvard University, where I received an S.M. in Applied Mathematics and Ph.D in Economics. For the past fifteen years, I have been engaged in a research program studying privatization, competition, and regulation in network industries such as electricity and natural gas. A major focus of my academic research is market design in restructured electricity markets. Over the past ten years, I have worked on aspects of the design and operation of the PJM, New York, New England and California electricity markets, as well as virtually all restructured electricity markets currently operating around the world. Since April 1, 1998, I have been the Chairman of the Market Surveillance Committee (MSC) for the Independent System Operator (ISO) of California electricity supply industry. A copy of my CV is attached to this testimony as Appendix A. It lists the documents I have authored or co-authored as Chairman of the MSC.

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Q. HAVE YOU PREVIOUSLY FILED TESTIMONY AT THE COMMISSION?
A. I have not previously filed testimony at the Commission. However, I served as ERCOT’s Independent Economist to the Texas Nodal Team from February 2004 to November of 2004.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?
A. I am testifying on behalf of Denton Municipal Electric, hereafter referred to as “DME”.

Q. HOW IS YOUR TESTIMONY ORGANIZED?
A. My testimony begins in Section I with a statement of my qualifications. In Section II, I discuss the scope of my testimony. My testimony continues with Section III, which presents a summary of my conclusions and recommendations for this proceeding. Section IV continues with a description of my analysis of the nodal protocols as filed at the Commission. Section V concludes with a summary of my findings.

II. SCOPE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?
A. The purpose of my testimony is to present recommendations concerning proposed changes or deficiencies in portions of the nodal protocols as filed at the Commission concerning Congestion Revenue Rights, or CRRs.

Q. WHAT IS THE SCOPE OF YOUR TESTIMONY?
A. My testimony outlines the market efficiency, transactions costs and distributional equity advantages of allocating CRRs as opposed to auctioning them as proposed in the nodal protocols.
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Q. WHAT HAVE YOU RELIED UPON IN MAKING YOUR EVALUATION AND ARRIVING AT YOUR CONCLUSIONS AND RECOMMENDATIONS?

A. I have relied upon the nodal protocols filed at the Commission on September 23, 2005, the Commission’s Order in Project 26376 which established the stakeholder process to create the nodal protocols and directed certain objectives and standards be met in establishing the protocols.

Q. WHAT STANDARD DID YOU APPLY IN EVALUATING THE NODAL PROTOCOLS CONCERNING CONGESTION REVENUE RIGHTS?

A. I relied upon the standards set in the Public Utility Commission of Texas (PUC) in their Preliminary Order issued in this docket, particularly Section III, which details the issues to be addressed in this proceeding, which includes:

1. Reliability unit commitment;
2. The proposed credit requirements, including their scope and adequacy;
3. The day-ahead market;
4. Load zones, including their number and configuration;
5. Congestion-revenue rights, including their distribution; and
6. The real-time market

III. CONCLUSIONS AND RECOMMENDATIONS

Q. PLEASE SUMMARIZE THE CONCLUSIONS THAT YOU HAVE REACHED AS A RESULT OF YOUR ANALYSIS.

A. I have reached the following conclusions:
1) The nodal protocols, as filed, establish a mechanism for distribution of CRRs that includes allocation of pre-assigned CRRs (PCRRs) to NOIEs with ownership or contractual commitments that were of a term of five years or longer and in place prior to September 1, 1999. (Sect. 7.4.1)

2) The nodal protocols call for certain flowgate rights associated with wind generation in the McCamey area to be allocated to available wind generation resources in the area. (Sect. 7.7)

3) The nodal protocols call for all remaining CRRs to be auctioned in a series of annual and monthly auctions. (Sect. 7.5.1)

4) Proceeds from the auctioning of CRRs are to be distributed to QSEs on a zonal load ratio share basis for CRRs with the source and sink points in the same zone and on an ERCOT-wide load ratio share basis for CRRs with the source and sink points in different zones. (Sect. 7.5.7)

5) The distribution of CRR auction revenues is guaranteed for the first three years only. Within the first three years of the implementation of the nodal market design the Protocols direct the ERCOT Board to consider extending this policy or ratify another alternative. (Sect. 7.5.7)

6) The Protocols, as filed, do not serve the long term public interest because they auction CRRs instead of allocating CRRs to loads that are ultimately paying for congestion in their zonal average LMP prices.

7) Even if the Commission determines that auctioning CRRs is in the public interest, the Protocols, as filed, do not serve the long term public interest because they do not guarantee that CRR auction revenues will be allocated to the loads that are paying the price for congestion in their zonal average LMP prices, beyond three years into the nodal-pricing market.

To summarize, if the nodal Protocols are to be in the public interest, they must take into account the needs and interests of all parties. This includes the interests of loads and load-serving entities, who ultimately pay for the costs of congestion under the nodal market design.

Q. PLEASE SUMMARIZE THE RECOMMENDATIONS THAT YOU ARE MAKING AS THE RESULT OF YOUR ANALYSIS.
A. Based on my analysis of the nodal Protocols as filed, the requirements of the nodal market design set forth in the Commission’s order in Project 26376 and other material review and studied I recommend the following:

1) The nodal protocols should be amended to allocate CRRs directly to the loads in ERCOT instead of being auctioned to all market participants. Loads should be allowed, but not required, to sell these CRRs to other parties.

2) If the Commission does not allocate CRRs to loads, the nodal protocols should be amended to ensure that auction revenues are allocated to loads in perpetuity in a manner similar to that guaranteed for the first three years of the nodal protocols.

IV. ANALYSIS OF CRR ISSUES

Q. WHAT IS YOUR UNDERSTANDING OF THE MANNER IN WHICH CRRS ARE TREATED IN THE NODAL PROTOCOLS?

A. I understand that ERCOT will allocate certain CRRs, which are defined as Pre-assigned CRRs or PCRRs to NOIEs who have existing ownership or purchase arrangements from generators of at least five years in length and were entered into prior to September 1, 1999. ERCOT is also to allocate certain flowgate rights to the wind generation unit owners in the McCamey area. The remaining CRRs are to be auctioned to eligible CRR Account Holders. The auctions will be held on an annual basis for one and two year CRRs and on a monthly basis for monthly CRRs. CRR owners can resell previously acquired CRRs at the auctions.

Q. DO YOU THINK THERE IS A BETTER METHOD TO MITIGATE THE IMPACT OF EXCESS COLLECTIONS FOR LOADS TO FUND CRR PAYMENTS THAN THE ALLOCATION OF CRR AUCTION PROCEEDS?
A. Yes. A direct allocation of CRRs to loads enhances wholesale market efficiency and system reliability relative to the current two-step Auction Revenue Right (ARR) allocation and CRR auction mechanism. A simplified allocation mechanism reduces the cost to ERCOT of offering CRRs and the cost to market participants of obtaining CRRs. Finally, a simplified allocation can enhance the competitiveness of the ERCOT retail electricity market.

Q. CAN YOU PROVIDE A DIRECT CRR ALLOCATION MECHANISM THAT ACHIEVES THE ABOVE GOALS?

A. Yes. I have prepared a paper which outlines the role of CRRs in a nodal market, describes the efficiency costs of auctioning versus allocating CRRs, and details a simple and transparent procedure for allocating CRRs to loads in a manner that maximizing the likelihood of achieving the goals described above. This mechanism also allows CRRs to be sold in a secondary market, if the initial owner finds this attractive. A copy of my paper is included as Attachment 1.

Q. DO YOU THINK THAT AUCTIONING CRRS AND ALLOCATING CRR AUCTION REVENUES TO LOADS DOES SERVE AS A PARTIAL HEDGE AGAINST LOCATIONAL PRICE DIFFERENCES?

A. Yes, but as I mentioned in my previous answer, the existing ARR allocation and CRR auction mechanism is dominated by a direct allocation of CRRs to loads.

Q. WHAT IS THE DISPOSITION OF THE REVENUES ERCOT RECEIVES FROM THE CRR AUCTIONS IN THE NODAL PROTOCOLS?

A. For the first three years after implementation of the nodal market, the Protocols call for auction revenues to be distributed to QSEs on a load ratio share basis. CRRs in
which the source and sink lie in the same zone will have the auction revenues associated with these CRRs allocated on a load ratio share to QSEs within the zone. CRRs in which the source and sink lie in different zones will have the auction revenues associated with these CRRs allocated to QSEs on an ERCOT-wide load ratio share basis.

Q. WHAT IS THE DISPOSITION OF THE REVENUES ERCOT RECEIVES FROM THE CRR AUCTION AFTER THE INITIAL THREE YEARS OF THE NODAL MARKET?

A. That is uncertain. The current filed nodal Protocols state that prior to the end of the first three years of the market, the ERCOT Board will consider whether to extend the policy of allocating CRR revenues back to QSEs on a load ratio share basis or ratify another alternative.

Q. DO YOU BELIEVE THAT CRR AUCTION REVENUES SHOULD BE ALLOCATED TO LOADS AS CALLED FOR IN THE FIRST THREE YEARS OF THE NODAL PROTOCOLS?

A. Yes, if CRRs are to be auctioned rather than allocated to loads. Loads will pay for energy based on the weighted zonal average of LMPs within the zone in which they are located. This price not only reflects the price paid to generators for their production, but also includes the additional cost of dispatching high-cost generation units local to the major ERCOT load centers instead of lower-cost distant generation units. ERCOT uses the revenues collected from loads in excess of those paid out to generation unit owners to fund CRRs. Allocation of CRR auction revenues to QSEs on a zonal basis for CRRs with source and sink in the same zone and on a ERCOT-
wide load ratio share basis for CRRs with source and sink in different zones is an way
to ensure that the parties funding the CRRS via the excess collections from loads
receive the benefit of the auction revenue received from the sale of those CRRs..

V. SUMMARY

Q. PLEASE SUMMARIZE YOUR FINDINGS.

A. Auction of CRRs and the distribution of auction proceeds to QSEs on a load ratio
share basis as proposed in the Nodal Protocols is not in the public interest because
there is an alternative available that will lead to a more efficient wholesale market
outcomes, a more reliable transmission network, a lower cost to operate and
participate in the short-term wholesale market. This mechanism also increases the
likelihood that all LSEs, both the very small and very large ones, benefit from the
transition to a LMP market relative to the proposed ARR allocation and CRR auction
mechanism. Finally, the proposed simplified direct allocation mechanism facilitates a
competitive retail market more than the proposed CRR auction mechanism. The
logic underlying these conclusions is discussed in the attached paper..

If the Commission decides to proceed with the CRR auction construct as detailed in
the Nodal Protocols, the allocation of auction proceeds to QSEs on a load ratio share
basis, both zonally and ERCOT-wide, as appropriate, should be established in
perpetuity. The directive to have the ERCOT Board review this approach and
consider alternative approaches prior to the end of the first three years of the nodal
market should be removed from the nodal protocols.
Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.
APPENDIX A

Professional Qualifications of Frank A. Wolak

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FAX: 650-725-5702, Internet Address: wolak@zia.stanford.edu
Homepage: http://www.stanford.edu/~wolak

Work Experience

September 1986 to Present
Professor, Department of Economics, Stanford University.

September 1989 to September 1990
National Fellow, Hoover Institution, Stanford University.

June 1985 to August 1986
Postdoctoral Research Fellow, Department of Economics, Harvard University.

June 1980 to September 1981
Visiting Staff Member, Los Alamos National Laboratory, Economics Group, Los Alamos, NM.

Research Interests
Industrial Organization, Regulatory Economics, Econometrics, and Health Economics.

Teaching Interests
Empirical Industrial Organization, Regulatory Economics, Econometric Theory

Professional Awards and Honors
Chairman, Market Surveillance Committee, California Electricity Industry Independent System Operator, April 1998-
Invited Lecture, World Congress of Econometric Society, Seattle, 2000
Invited Lecture, Econometric Society European Meetings, Toulouse, France, 1997
Research Associate, National Bureau of Economic Research, 1993-
Allen V. Cox Medal, 1991. Awarded annually to the Stanford University faculty member who has established a record of excellence directing undergraduate research over a number of years.
Faculty Research Fellow, National Bureau of Economic Research, 1991-1993
Presidential Young Investigator Award, National Science Foundation, 1990-1995

Education
June 1985, Ph.D., Economics, Harvard University, Cambridge, MA.
June 1984, S.M., Applied Mathematics, Harvard University, Cambridge, MA.
August 1980, M.A., Economics, University of New Mexico, Albuquerque, NM.
May 1979, B.A., Economics, Rice University, Houston, TX.
Frank Anthony Wolak

**Market Surveillance Committee Reports/Opinions**


Frank Anthony Wolak

Market Surveillance Committee Reports/Opinions


“Opinion on Oversight and Investigation Review,” July 22, 2002


“Opinion on Scheduling Priority for Balanced Schedules,” May 9, 2003


“Comments on Proposal to Establish a Federal Control Area from Within the California ISO Control Area,” August 7, 2003


“Opinion on Large Generator Interconnection Rule,” January 7, 2004

“Managing Congestion Costs in the Miguel-Imperial Valley Region,” January 13, 2004

“Opinion on Defining ‘Workable Competition’ with Respect to the Creation of New Zones,” February 19, 2004


Frank Anthony Wolak

Publications


An Exact Test for Multiple Equality and Inequality Constraints in the Linear Regression Model, *Journal of the American Statistical Association*, vol. 82, no. 399, 1987, 782-793.


Frank Anthony Wolak


Frank Anthony Wolak


**Conference Proceedings**


**Working Papers** (Available at http://www.stanford.edu/~wolak)


Detecting Misspecified Variance Functions in the Heteroscedastic Regression Models, mimeo, August 1993.

Frank Anthony Wolak


Relative Prices, Electronic Substitution and Unobserved Heterogeneity in the Household-Level Demand for Postal Delivery Services, November 1997.


Regulation and the Leverage of Local Market Power in the California Electricity Market, July 1999 (with James Bushnell).

Designing a Competitive Wholesale Market that Benefits Consumers, October 2001

Competition-Enhancing Local Market Power Mitigation in Wholesale Electricity Markets, November 2002

Report on Brazilian Power Sector Reform, January 2003 (with Nils-Hendrik von der Fehr)

Using Environmental Emissions Permit Prices to Raise Electricity Prices: Evidence from the California Electricity Market, March 2003 (with Jonathan Kolstad).


International Experience with Electricity Market Monitoring, June 2004

Reforming the Indian Electricity Supply Industry, June 2004

Book Reviews


Frank Anthony Wolak

Government Reports


U.S. Congressional Testimony

Senate Committee on Governmental Affairs, June 13, 2001, On Role of Federal Energy Regulatory Commission in Functioning of California Electricity Market

House Committee on Financial Services, June 20, 2001, On California Energy Crisis and Its Implications for Long-Term Energy Policy


Senate Committee on Government Affairs, November 12, 2002, On the Lessons that Should Be Learned About Regulating Energy Markets from the California Electricity Crisis and the Enron Bankruptcy

Newspaper Opinion/Editorial Pieces

“Will FERC See the Light on the Law?” (Los Angeles Times, 4/30/01).


“FERC Fixes Have Fallen Short” (San Jose Mercury News, June 20, 2001).

“$9 Billion Rebate Should Be Just the Beginning,” (North County Times, July 11, 2001).


“Upgrading Power Grid Could Lead to Lower Prices” (San Jose Mercury News, August 28, 2003)

“Why Are California Gasoline Prices So High?” (San Jose Mercury News, April 25, 2004)
Frank Anthony Wolak

Research Grants

Winter 1989 to Spring 1990
Econometric Models of the Regulatory Rate-Setting Process, Center for Economic Policy Research, Stanford University, $20,000.

Summer 1990 to Spring 1991
Regulation of Water Delivery in California, Stanford University Office of Technology Licensing Research Incentive Fund, $20,750.

Summer 1990 to Summer 1991
Empirical Studies of Japanese Industry, CEPR Program on the Japanese Economy, $17,000.

Summer 1990 to Summer 1996
Empirical Studies of Firm and Industry Behavior, 5-Year Presidential Young Investigator Award, National Science Foundation, $312,500.

Summer 1993 to Winter 1997
The Trade Effects of Antidumping Investigations, 3-Year National Science Foundation, $165,000 (with R.W. Staiger).

Summer 1994 to Spring 1996
Studies of Competition and Demand in Telecommunications, Postal Delivery and Cable Television Markets, Markle Foundation, $75,000.

Summer 1994 to Summer 1996
Measuring the Structure of Consumer Demand for Electricity Using Real-Time Pricing Data from the United Kingdom Electricity Market, Electric Power Research Institute, $30,000.

Summer 1995 to Summer 1996
A Comparison of Statistical Forecasting Models for Real-Time Electricity Price, Electric Power Research Institute, $35,000.

Summer 1997 to Summer 2001
Empirical Studies of Regulated Industries, National Science Foundation, 3-Year Grant, National Science Foundation, $212,612

Autumn 2001 to Summer 2002
Research on California Energy Policy, Energy Foundation, 1-Year Grant, $65,000.

Summer 2004 to Summer 2006
Empirical Methods for Measuring and Improving Market Performance in Network Industries, 2-Year Grant National Science Foundation, $121,000
Frank Anthony Wolak

Professional Service

Member, Electric Power Networks Efficiency and Security Panel, National Science Foundation, 2002-03
Member, Economics Panel, National Science Foundation, 1998-2000
Associate Editor, *Journal of Econometrics*, 1994-2002
Associate Editor, *Journal of Industrial Economics*, 1995-2002
Program Committee Member, 1995 North American Winter Meeting of the Econometric Society.
Program Committee Member, 1996 American Economic Association Meetings
Program Committee Member, 1997 North American Summer Meeting of the Econometric Society

Departmental and University Service

Co-Chairman, Junior Faculty Recruiting Committee, 1992, 1997, 2000-2004
Faculty Participant, Economics Department Summer Honors Program, 2000-
Econometric Comprehensive Exam Committee, 1989-
Faculty Participant, Athlete Recruiting for Stanford Athletic Department, 1989-
Associate Director, Center for Economic Policy Research, Stanford University, 1996-1998
Member, Dean's Advisory Committee on Curriculum, 1994-1995
Director of Undergraduate Studies, Department of Economics, September 1994- September 1996
Associate Chair, Department of Economics, September 1993-September 1994
Faculty Member, American Economic Association Summer Minority Program, 1993-1995.

Graduate Students Supervised (Primary Advisor)

Vivian Ho Hamilton, Ph.D., 1991
Miriam Culjak, Ph.D., 1993
Christopher P. Kilby, Ph.D., 1993
Dana P. Goldman, Ph.D., 1994
Stephen Schmidt, Ph.D., 1994
Paul Liu, Ph.D., 1995
Gregory Crawford, Ph.D., 1997
Christopher Timmons, Ph.D. 1997
Jennifer Chen, Ph.D., 1997
Matthew Shum, Ph.D., 1998
Raphael Thomadsen, Ph.D., 2001
Johannes Van Biesebroeck, Ph.D., 2001
Jun Ishii, Ph.D., 2001
Marshall Jingming Yan, Ph.D., 2001
Faye Steiner, Ph.D., 2001
Ron Borekowskii, Ph.D., 2002
Jeremy Fox, Ph.D., 2003
John Romley, Ph.D., 2003
Robert McMillan, Ph.D. 2004
Seung-Hyun Hong, Ph.D., 2005

Graduate Students Supervised (Reader/Advisor)
Sarah J. Lane, Ph.D., 1988
Craig College, Ph.D., 1989
David Green, Ph.D., 1990
Kuen-Kwan Ryu, Ph.D., 1990
Joel Waldfogel, Ph.D., 1990
Jeffrey Sundberg, Ph.D., 1991
Walter Garcia-Fontes, Ph.D., 1992
Penny Goldberg, Ph.D., 1992
Ng Hock Guan, Ph.D., 1992
Hilary W. Hoynes, Ph.D., 1992
J. Bradford Jenson, Ph.D., 1992
William H. Lehr, Ph.D., 1992
Susan Smart, Ph.D., 1992
Lisa Takeyama, Ph.D., 1992
Michael Cragg, Ph.D., 1993
Mario Epelbaum, Ph.D., 1993
Bernd Fitzenberger, Ph.D., 1993
Young Sun Ghauh, Ph.D., 1993.
Fumihiro Goto, Ph.D., 1993
Barton H. Hamilton, Ph.D., 1993
Giovanni Maggi, Ph.D., 1994
Thomas N. Hubbard, Ph.D., 1995
Dongseok Kim, Ph.D., 1995
Scott Stern, Ph.D., 1995
Janusz Mrozek, Ph.D., 1996
Hoon Sahib, Soh, Ph.D., 1996
Harumi Ito, Ph.D., 1997
Jason S. Scott, Ph.D., 1997
Andrea Breuhan, Ph.D. 1997
William Vogt, Ph.D. 1998
Michael Mazzeo, Ph.D., 1998
David Mancuso, Ph.D., 1999
Cristian Santesteban, Ph.D., 2000
Koshy Mathai, Ph.D. 2002