

**DECLARATION OF BRUCE E. BIEWALD**  
**Dated October 27, 2011**

- (1) My name is Bruce Edward Biewald, and all of the statements made in this declaration are based on my personal knowledge.
  
- (2) I am the President of Synapse Energy Economics Inc., a consulting company in Cambridge, Massachusetts specializing in analysis of electric power systems. I have thirty years of experience advising state agencies, consumer and environmental advocates, utilities and others on issues related to the production and consumption of energy. I have testified in more than one hundred utility regulatory proceedings in twenty-six states and two Canadian provinces, in cases in state and federal Courts, and in proceedings of the Federal Energy Regulatory Commission and the Nuclear Regulatory Commission's Atomic Safety and Licensing Board. I have co-authored more than one hundred reports, including studies for the Electric Power Research Institute, the US Department of Energy, the US Environmental Protection Agency, the Office of Technology Assessment, the Ozone Transport Commission, the New England Governors' Conference, the New England Conference of Public Utility Commissioners, the National Association of Regulatory Utility Commissioners, and the United Nations Framework Convention on Climate Change. My papers have been

published in the *Electricity Journal*, *Energy Journal*, *Energy Policy*, *Public Utilities Fortnightly*, and numerous conference proceedings.

- (3) As president of Synapse Energy Economics, I oversee a staff of twenty-five individuals, conducting many dozens of consulting assignments each year. Our work includes consulting projects dealing with power plant costs and performance, electric power system reliability, generation asset valuation and divestiture, electric industry restructuring, stranded costs, system benefits, market power, mergers and acquisitions, rate cases, power supply contracts and performance standards, renewable power generation, demand-side management, air emissions from power plants, and electricity market simulation modeling for price forecasting and market power analysis. Synapse's governmental clients include federal agencies such as the Environmental Protection Agency, state Attorneys General, Consumer Advocates, utility regulatory commissions, and a variety of cities and towns. We also work for a number of non-governmental consumer advocates and environmental organizations, as well as associations of agencies, foundations, and private clients.
- (4) Prior to founding Synapse, I was with Energy Systems Research Group (later Tellus Institute) where I was the manager of the electricity program,

and consulted on a wide range of electric system regulatory and economic issues. I have a B.S. from the Massachusetts Institute of Technology where I studied Architecture, Building Technology, and Energy Use in Buildings. Appendix A contains my resume, which includes a listing of past testimony, papers, and reports.

- (5) I have been asked to examine documents related to the Declaration of Frank P. Prager, Vice President of Environmental Policy and Service for Xcel Energy (the parent of Southwestern Public Service Company (“SPS”)) focusing on the assumptions and methodologies underlying Mr. Prager’s conclusions.
- (6) I have reviewed the September 20, 2011, letter from the Southwest Power Pool (“SPP”) to EPA Administrator Lisa P. Jackson describing the results of an analysis conducted by SPP. I have also reviewed the output of an EPA model run to which I believe that letter refers, specifically WebReady\_ParsedFile\_TR\_Remediation\_Final\_2012 (EPA-HQ-OAR-2009-0491-4431).
- (7) Mr. Prager’s Declaration relies upon the analysis by SPP. The letter describing the SPP analysis is provided as Attachment D to Mr. Prager’s

Declaration. Mr. Prager refers to the SPP letter in paragraph 23 on page 9 of his own Declaration, stating that:

“The Southwest Power Pool agrees with our analysis. In a recent reliability assessment of the EPA dispatch model underlying CSAPR, the Southwest Power Pool (SPP) concluded that CSAPR is ‘likely to cause SPP to be out of compliance with the applicable National Electric Reliability Council [reliability] standards as early as 2012.’”

- (8) The SPP analysis is not an analysis of CSAPR and the possible impacts of CSAPR on the SPP system. Rather, SPP’s analysis is a load flow modeling exercise in which SPP simply “removed all generation units in its models that consumed zero fuel in the EPA models.” (Prager attachment D at 1 n.2). These units consist almost entirely of gas-fueled or dual gas/oil-fueled units typically used for a small number of hours each year to meet peak loads. *See* WebReady\_ParsedFile\_TR\_Remedies\_Final\_2012.xls (EPA-HQ-OAR-2009-0491-4431).
- (9) SPP offer no explanation of how the observation that certain peaking units are modeled as not consuming fuel in EPA’s IPM model would in any way justify the removal of the units from SPP’s reliability planning models. EPA does not project that the units will or should be retired, and SPP does not

claim that EPA has made such a projection. Neither SPP nor SPS offers any indication that they believe that any peaking capacity in SPP or elsewhere actually will be retired in response to CSAPR. I have not come across any information in my professional activities leading me to believe that CSAPR will cause retirements of peaking units.

- (10) SPP's decision to remove the peaking capacity from the load flow analysis is not reasonable. This capacity exists on the SPP system, and it has operated in recent years. *See* EPA, Clean Air Markets Database, <http://camddataandmaps.epa.gov/gdm/>. There is no reason to believe that the peaking capacity will not continue to be available and used for as long as the units' owners continue to find maintenance of the capacity to be necessary and economic.
- (11) It is not appropriate to interpret the fact that a particular peaking unit is shown as not running in the output of an IPM model run as evidence that the unit is or should be unavailable. Indeed, the EPA also ran a "base case" IPM run that does not include CSAPR. In that base case model run, roughly the same amount of SPP capacity shows zero generation as in the CSAPR case. In other words, if SPP's logic for removing this capacity from its reliability model is that the capacity does not operate in an EPA model run, then that

logic would apply to a “base case” without CSAPR as well, and the unavailability of that capacity could not reasonably be attributed to CSAPR.

- (12) The reasons that a particular peaking unit might show zero operation in the output of an IPM model run include design tradeoffs within the model’s algorithms. Specifically, it does not surprise me that generating capacity that in reality operates at low capacity factors would show up in IPM as not running at all. IPM is a linear programming model, which simplifies aspects of electricity systems, including most importantly for this discussion the representation of generating unit forced outages, in order to focus on other features of electricity systems such as state-level emissions. IPM accounts for generating unit forced outages deterministically as a reduction in unit capacity ratings, which I view as a reasonable approach for a model used for IPM’s purposes in terms of broad analyses of environmental policies, but which tends to understate the proportion of total system generation that will be provided from peaking units. Underestimation of the usage of peaking units is of little importance to state-level emissions estimates because such units are very small contributors to those emissions. In contrast, planning models whose primary focus is the ability of the system to reliability respond to a wide range of system events, including generating unit outages, treat such outages probabilistically and thereby get more realistic estimates

of the amount of predicted output from peaking units. A reasonable planner concerned with projecting the output of a peaking unit (or deciding whether to retire a peaking unit) would use a probabilistic model for that purpose, not a linear programming model such as IPM.

- (13) SPP calls its analysis “SPP Reliability Assessment Based on EPA CSAPR Model,” but it is only “based on” the EPA modeling in that it targets peaking generators to remove from the modeling based on EPA model runs performed in the course of the CSAPR rulemaking. There is no connection with CSAPR’s requirements or impacts. If SPP were to do a proper analysis of CSAPR, then it would look at the options available to generators and build an objective analytical approach working from there to see how various realistic scenarios influence system dispatch and reliability. That is not what SPP has done in this case.

I declare under penalty of perjury that the foregoing is true and correct.



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Bruce E. Biewald

Executed on October 27, 2011 in Cambridge, Massachusetts.



## **APPENDIX A BIEWALD RESUME**

Bruce Edward Biewald  
President  
Synapse Energy Economics, Inc.  
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### **PROFESSIONAL EXPERIENCE**

**Synapse Energy Economics, Inc.**, Cambridge, MA. President, 1996 to present. Consulting on issues of energy economics, environmental impacts, and utility regulatory policy, including electric power system planning, air emissions, climate change policy, market power, mergers and acquisitions, generation asset valuation and divestiture, nuclear and fossil power plant costs and performance, renewable resources, power supply contracts and performance standards, green marketing of electricity, nuclear plant decommissioning and radioactive waste issues, environmental externalities valuation, energy conservation and demand-side management, electric power system reliability, avoided costs, dispatch modeling, economic analysis of power plants and resource plans, portfolio management, risk analysis and risk management.

**Tellus Institute**, Boston, MA. Senior Scientist and Manager of the Electricity Program, 1989 to 1996, Research Associate and later Associate Scientist, 1980-1988.

Responsible for research and consulting on all aspects of electric system planning, regulation, and restructuring.

### **EDUCATION**

Massachusetts Institute of Technology,  
BS 1981, Architecture, Building Technology, Energy Use in Buildings.  
Harvard University Extension School,  
1989/90, Graduate courses in micro and macroeconomics.

## **SUMMARY OF TESTIMONY, PUBLICATIONS, AND PRESENTATIONS**

Expert testimony on energy, economic, and environmental issues in more than one hundred utility regulatory proceedings in twenty six states and two Canadian provinces, in cases in State and Federal Courts, and in proceedings of the Federal Energy Regulatory Committee and the Nuclear Regulatory Commission's Atomic Safety and Licensing Board.

Co-author of more than one hundred reports, including studies for the Electric Power Research Institute, the U.S. Department of Energy, the U.S. Environmental Protection Agency, the Office of Technology Assessment, the New England Governors' Conference, the National Association of Regulatory Utility Commissioners, and the United Nations Framework Convention on Climate Change.

Papers published in the Electricity Journal, the Energy Journal, Energy Policy, Public Utilities Fortnightly, and numerous conference proceedings.

Invited to speak by American Society of Heating, Refrigerating, and Air-Conditioning Engineers, American Society of Mechanical Engineers, International Atomic Energy Agency, National Association of Regulatory Utility Commissioners, National Association of State Utility Consumer Advocates, National Consumer Law Center, the Latin American Energy Association (OLADE), the Swedish Environmental Protection Agency (SNV), the U.S. Environmental Protection Agency, the European Federation of Clean Air and Environmental Protection Associations, and others.

## **TESTIMONY**

**United States District Court of Appeals for the District of Columbia Circuit (Case 11-1315) United States Environmental Protection Agency v. Luminant Generation Company, LLC – October 2011**

Declaration on the use of probabilistic computer models to properly analyze system reliability, with regard to the Cross-State Air Pollution Rule (CSAPR).

**Nova Scotia Utility and Review Board – April 2011**

Testimony on community-based feed-in tariffs for renewable energy.

**United States District Court for the Middle District of Louisiana (Civil Action No. 09-CV-100-RET-CN) United States v. Louisiana Generating LLC – October 2010**

Rebuttal report on the use of computer models for electric system planning and projections of generating unit operations, including PROMOD simulation of power system dispatch. Also deposition January 2011.

**United States District Court for the Eastern District of Michigan (Case 2:10-cv-13101-BAF-RWS) United States v. DTE Energy Company – June 2010**

Declaration on the use of computer models for electric system planning and projections of generating unit operations. Also second declaration November 2010.

**United States District Court for the North District of Alabama (Civil Action No. 2:01-CV-00152-VEH) United States v. Alabama Power Company – December 2009**

Expert report on use of computer models for electric system planning and projections of generating unit operations. Also rebuttal report in May 2010, and deposition in June 2010.

**United States District Court for the Eastern District of Kentucky, Lexington Division (Case 5:05-cv-0075-KSF) United States v. Kentucky Utilities Company – October 2008**

Expert report on use of computer models for electric system planning, capital investment planning and economic analysis, and projections of generating unit operations.

**Nova Scotia Utility and Review Board – August 2008**

Review of rate case issues; power plant depreciation and load forecasting.

**Nova Scotia Utility and Review Board – March 2008**

Review of Nova Scotia Power Inc.'s demand-side management plan.

**Indiana Utility Regulatory Commission (Cause Nos. 43114 and 43114S1) – May 2007**

Review of IGCC Plant Proposal by Duke Energy Indiana and Vectren Testimony of Synapse Witnesses. Also cross answering testimony later in the month.

**California Public Utilities Commission (Docket No. R.06-02-013) – March 2007**

Joint testimony with William Steinhurst and Rick Hornby on electric utility long-term planning and procurement, including procurement strategy, treatment of carbon dioxide emissions, credit and collateral policies, customer risk tolerance, and resource needs.

**New Jersey Board of Public Utilities (Docket No. EM05020106) – November and December 2005 and March 2006**

Joint testimony with Bob Fagan and David Schlissel on the market power implications of the proposed merger between Exelon Corp. and Public Service Enterprise Group.

**Indiana Utility Regulatory Commission (Cause Nos. 42861) – October 2005**

Vectren (SIGECO) environmental compliance planning, including climate change policy and carbon price forecasting, energy efficiency and renewables as compliance options, and cost recovery issues.

**United States District Court for the Eastern District of Kentucky, Lexington Division (Civil Action No.04-34-KSF, United States v. East Kentucky Power Cooperative – September 2005**

Expert report on state regulation of electric utilities, use of computer models for system planning, capital investment planning and economic analysis, and projections of generating unit operations.

**United States District Court for the Southern District of Indiana (Civil Action No.IP99-1693 C-M/S, United States v. Cinergy – May 2005**

Expert report on state regulation of electric utilities, forecasting sales and resource requirements, use of computer models for system planning, capital investment planning and economic analysis, projections of generating unit operations, and the relationship between generator availability and output. Also, rebuttal report in September.

**Federal Energy Regulatory Commission (Docket No. EC05-43-000) – April 2005**

Market power analysis of the proposed merger of Exelon Corporation and Public Service Enterprise Group Incorporated. (Joint affidavit with David Schlissel.)

**Nuclear Regulatory Commission Atomic Safety and Licensing Board (Docket No. 52-007-ESP and ASLBP No. 04-821-01-ESP) – April 2005**

Affidavit on the environmental impacts and economic costs of a proposed new nuclear power project and alternatives.

**Indiana Utility Regulatory Commission (Cause Nos. 42622 and 42718) – March 2005**

Public Service Company of Indiana environmental compliance planning, including cost estimates for emission control technologies, climate change policy and carbon price forecasting, energy efficiency and renewables as compliance options, power plant retirement economics, and cost recovery issues.

**National Research Council, Division on Engineering and Physical Sciences,  
Board on Energy and Environmental Systems (Project No. BEES-J-03-03-A)  
– March 2005**

Alternatives for replacing the generation of the Indian Point Energy Center nuclear facility.

**Georgia Public Service Commission (Docket No. 18300-U) – October 2004**

Georgia Power Company's cost of service study, treatment of electrical distribution equipment, and proposed rates for the Metropolitan Atlanta Rapid Transit Authority.

**Texas Public Utility Commission (Docket No. 29526) – June 2004**

Issues in CenterPoint Energy Houston Electric LLC's true up filing, including environmental cleanup costs, excess mitigation credits, and construction work in progress. Also rebuttal testimony on June 14.

**Texas Public Utility Commission (Docket No. 28818) – April 2004**

The Independent Transmission Operator proposal of Energy Gulf States Utilities, Inc. (prefiled testimony adopted by Paul Peterson).

**Indiana Utility Regulatory Commission (Cause No. 42359) – August 2003**

Public Service Company of Indiana rate making issues including the impact of trackers on risks to shareholders and customers, costs of environmental compliance, treatment of merchant plant investment and risk, and joint dispatch issues.

**Nevada Public Utilities Commission (Docket No. 03-1014) – April 2003**

Review of Sierra Pacific Power Company's risk management and procurement of electric power in the wholesale markets.

**Nevada Public Utilities Commission (Docket No. 02-11021) – March 2003**

Review of Nevada Power Company's risk management and procurement of electric power in the wholesale markets.

**United States District Court for the Southern District of Illinois (Civil Action No. 99-833-MJR, United States v. Illinois Power Company and Dynegy Midwest Generation, Inc.) – August 2003**

Testimony at trial on analysis and opinions in rebuttal report dated October 2002 on use of computer models for system planning, projections of generating unit operations, and the relationship between generator availability and output.

**State of Vermont, Windham Superior Court (Appeal of USGen New England, Inc. from 2001 Property Valuation by the Town of Rockingham) – September 2002**

Electricity market prices and economic valuation of hydroelectric generating plant.

**United States District Court for the Middle District of North Carolina (Civil Action No. 1:00 CV 1262, United States v. Duke Energy Corporation) – August 2002**

Expert report on use of computer models for system planning, projections of generating unit operations, and the relationship between generator availability and output. (Joint report with Phil Hayet.)

**Indiana Utility Regulatory Commission (Cause No. 41746) – July 2002**

Reply testimony on a rate case settlement agreement, dealing with issues including NiSource's financial condition, service quality, environmental commitment, and electric rate impacts.

**Connecticut Department of Public Utility Control (Docket No. 00-12-13RE01) – July 2002**

The proposed sale of Seabrook Nuclear Station to FPL Energy Seabrook, LLC. Market power issues and market modeling.

**United States District Court for the Southern District of Indiana (Civil Action No. IP99-1692-C-M/S, United States v. Southern Indiana Gas and Electric Company) – June 2002**

Declaration on confidential business information and competitive harm.

**Nevada Public Utilities Commission (Docket No. 02-2002) – April 2002**

Review of Sierra Pacific Power Company's risk management and procurement of electric power in the wholesale markets.

**Vermont Public Service Board (Docket No. 6596) – March 2002**

Used and useful policy issues, electricity market prices, and above market costs of the purchase from Hydro Quebec.

**Nevada Public Utilities Commission (Docket No. 01-11029) – February 2002**

Review of Nevada Power Company's risk management and procurement of electric power in the wholesale markets.

**Vermont Public Service Board (Docket No. 6545) – January 2002**

Economic analysis of the proposed sale of Vermont Yankee nuclear plant and an associated Purchased Power Agreement.

**New Jersey Board of Public Utilities (Docket No. EM01050308) – September 2001**

Analysis of the proposed merger between Conectiv and PEPCo. Also, surrebuttal testimony in November. (Joint testimony with David Schlissel.)

**Indiana Utility Regulatory Commission (Cause No. 41954) – June 2001**

System planning and joint operation in a partially deregulated context.

**State of Vermont, Windham Superior Court (Dockets S 362-9-99 and S372-9-99) – May 2001**

Deposition on electricity market prices and economic valuation of hydroelectric generating plant.

**Federal Energy Regulatory Commission (Docket No. ER01-200-001) – April 2001**

Termination of the Cinergy Operating Agreement, treatment of merger savings, and affiliate relationships. Also cross-answering testimony in April.

**New Jersey Board of Public Utilities (Docket No. EM00110870) – April 2001**

Analysis of the proposed merger between FirstEnergy and GPU. Also, supplemental testimony in April. (Joint testimony with David Schlissel.)

**Vermont Public Service Board (Dockets Nos. 6120 and 6460 – March 2001**

Used and useful policy issues, electricity market prices, and above market costs of the purchase from Hydro Quebec. Also, surrebuttal testimony in April.

**United States District Court for the Northern District of New York (Civil Action No. 00-CV-1738) – January 2001**

Affidavit on the issuance and trading of SO<sub>2</sub> emission allowances under the Title IV of the Clean Air Act, in Clean Air Markets Group v. George E. Pataki et al.

**Department of Energy (Docket No. EE-RM-500) – December 2000**

Oral testimony on proposed rules for central air conditioner and heat pump energy conservation standards.

**Illinois Commerce Commission (Docket No. 00-0361) – July 2000**

Review of ComEd's funding for nuclear power plant decommissioning.

**California Public Utilities Commission (Rulemaking 99-10-025) – July 2000**

Distributed generation and related rate design issues. Also, rebuttal testimony in August.

**Massachusetts Department of Environmental Protection – July 2000**

Comments on reliability implications of proposed emission standards for power plants.

**Arkansas Public Service Commission (Docket No. 00-048-R) – June 2000**  
Requirements for electricity market power analyses.

**United States District Court for the Middle District of North Carolina  
(1:99CV00033) – March 2000**

Expert report on replacement power costs in Carolina Power & Light Company vs. Yuasa Exide, Inc.

**Illinois Commerce Commission (Docket No. 99-0115) – September 1999**  
Review of ComEd’s nuclear power plant decommissioning cost estimates.

**West Virginia Public Service Commission (Case No. 98-0452-E-GI) – August 1999**

AEP and Allegheny Power restructuring, market power, divestiture of generation, electric system market price modeling, statistical analysis of comparable sales, and responsibility for stranded costs and gains.

**Mississippi Public Service Commission (Docket No. 96-UA-389) – August 1999**  
Review of Entergy Mississippi, Inc. and Mississippi Power Company stranded cost filings, divestiture of generation, statistical analysis of comparable sales, responsibility for stranded costs and gains.

**Connecticut Department of Public Utility Control (Docket No. 99-03-36) – July 1999**

Connecticut Light and Power Company standard offer service, market prices for electricity and the influence of market power, simulation analysis of the New England electricity market.

**Connecticut Department of Public Utility Control (Docket No. 99-03-35) – July 1999**

United Illuminating Company standard offer service, market prices for electricity and the influence of market power, simulation analysis of the New England electricity market.

**Utah Public Service Commission (Docket No. 98-2035-04) – June 1999**

Cost savings expectations for the proposed merger of PacifiCorp and Scottish Power.

**Washington Utilities and Transportation Commission (Docket No. UE-981627) – June 1999**

Cost savings expectations for the proposed merger of PacifiCorp and Scottish Power and assessment of whether the merger is in the public interest.



**Federal Energy Regulatory Commission (Docket Nos. EC98-40-00, et al.) – April 1999**

Horizontal market power and barriers to entry in consideration of the proposed merger of American Electric Power Company and Central and South West Corporation.

**Connecticut Department of Public Utility Control (Docket No. 99-03-04) – April 1999**

Market power, market prices, and simulation modeling as related to the application of United Illuminating Company for recovery of stranded costs.

**Connecticut Department of Public Utility Control (Docket No. 99-02-05) – April 1999**

Market power, market prices, and simulation modeling as related to the application of Connecticut Light & Power Company for recovery of stranded costs.

**Maryland Public Service Commission (Case No. 8797) – January 1999**

Simulation analysis of the ECAR market and projected market prices for electricity for estimation of Potomac Electric Company's stranded generation costs and unbundled rates.

**Maryland Public Service Commission (Case No. 8795) – December 1998**

Simulation analysis of the PJM market and projected market prices for electricity for estimation of Delmarva Power and Light Company's stranded generation costs and unbundled rates.

**Maryland Public Service Commission (Cases Nos. 8794 and 8804) – December 1998**

Simulation analysis of the PJM market and projected market prices for electricity for estimation of Baltimore Gas and Electric Company's stranded generation costs and unbundled rates.

**Vermont Public Service Board (Docket No. 6107) – September 1998**

Excess capacity, used & useful, and the economics of Green Mountain Power's purchase from Hydro Quebec.

**Mississippi Public Service Commission (Docket No. 96-UA-389) – September 1998**

Analyses of market concentration and market power, behavior of affiliated companies, need for an independent system operator.

**California Public Utilities Commission (Application No. 97-12-020) – July 1998**

Nuclear power plant decommissioning and radioactive waste disposal. Also, rebuttal testimony in August.

**Federal Energy Regulatory Commission (Docket No. EC97-46-000) – June 1998**

Affidavit on market power implications of the proposed merger between Allegheny Power System and Duquesne Light Company.

**New Jersey Board of Public Utilities (Docket Nos. EX4120585Y, EO97070460, and EO97070463) – March 1998**

Economic and environmental benefits of energy efficiency, including estimation of marginal air emissions from the PJM System. (Joint testimony with Nathanael Greene, Edward Smeloff, and Thomas Bourgeois.)

**Vermont Public Service Board (Docket No. 6018) – February 1998**

Excess capacity and the economics of Central Vermont Public Service Company's purchase from Hydro Quebec.

**Public Service Commission of Maryland (Case No. 8774) – February 1998**

Market power implications of the APS-DQE merger.

**Federal Energy Regulatory Commission (Docket Nos. OA97-237-000 and ER97-1079-000) – January 1998**

Market power in New England electricity markets.

**British Columbia Utilities Commission – November 1997**

British Columbia Hydro and Power Authority Wholesale Transmission Services Application.

**Pennsylvania Public Utility Commission (Docket R-00973981) – November 1997**

West Penn Power Company Restructuring Plan. Environmental disclosure, consumer education, and allocation of default customers.

**Pennsylvania Public Utility Commission (Docket R-00974104) – November 1997**

Duquesne Light Company Restructuring Plan. Environmental disclosure, consumer education, nuclear decommissioning, and allocation of default customers. Also surrebuttal testimony in December 1997.

**Mississippi Public Service Commission (Docket No. 97-UA-496) – November 1997**

Petition of Mississippi Power Company for a Certificate of Public Convenience and Necessity Authorizing Construction of a Generating Plant in Jackson County.

**Pennsylvania Public Utility Commission (Docket Nos. R-00973953 and P-00971265) – November 1997**

Application of PECO Energy Company for approval of its restructuring plan and petition on Enron Energy Services Power, Inc. for approval of an electric competition and customer choice plan. Allocation of default customers.

**Vermont Public Service Board (Docket No. 5983) – October 1997**

Excess capacity and the economics of Green Mountain Power Company's purchase from Hydro Quebec. Also rebuttal testimony in December 1997 and supplemental rebuttal testimony in January 1998.

**Pennsylvania Public Utility Commission (Docket No. R-00973953) – September 1997**

Joint petition for partial settlement of PECO Energy Company's proposed restructuring plan and application for a qualified rate order. Environmental disclosure, nuclear decommissioning and spent fuel.

**Pennsylvania Public Utility Commission (Docket No. R-00974009) – September 1997**

Pennsylvania Electric Company's Restructuring Plan. Environmental disclosure, customer education, and nuclear issues.

**Pennsylvania Public Utility Commission (Docket No. R-00974008) – September 1997**

Metropolitan Edison Company's Restructuring Plan. Environmental disclosure, customer education, and nuclear issues.

**Indiana Legislature, Regulatory Flexibility Committee -- September 23, 1997.**

Testimony on "Electric Industry Restructuring To Benefit Consumers and the Environment: Stranded Costs, Nuclear Issues, and Air Emissions."

**Pennsylvania Public Utility Commission (Docket No. R-00973954) – June 1997**

Pennsylvania Power & Light Company's Restructuring Plan. Environmental disclosure, customer education, PJM market structure, nuclear decommissioning and spent fuel, rate design for stranded cost recovery. Also, surrebuttal testimony in August.

**Pennsylvania Public Utility Commission (Docket No. R-00973953) – June 1997**  
PECO Energy Company's Restructuring Plan. Environmental disclosure, PJM market structure, nuclear decommissioning and spent fuel.

**New York Public Service Commission (Case 96-E-0897) -- April 1997**  
Consolidated Edison Company's Plans for Electric Rate Restructuring. Analysis of market power in the New York City load pocket.

**Pennsylvania Public Utility Commission (Docket No. R-00973877) -- February 1997**  
Application of PECO Energy Company for Issuance of a Qualified Rate Order. Nuclear power plant decommissioning costs, stranded cost recovery, and securitization.

**New Hampshire Public Utilities Commission (DR 96-150) -- November 1996**  
Electric industry restructuring, including stranded costs, industry structure, market power, and nuclear issues.

**Massachusetts Department of Public Utilities (96-100) -- July 1996**  
Nuclear plant stranded costs and decommissioning.

**Vermont Public Service Board (5854) – July 1996**  
Electric industry restructuring, including stranded costs, industry structure, and environmental protection.

**Ontario Energy Board (H.R. 23) -- June 1995**  
Electricity rate options (joint evidence with John Stutz).

**Pennsylvania Public Utility Commission (R-00943271) -- April 1995**  
Discount rates and system benefits charge.

**Colorado Public Utilities Commission (94A-516A) – January 1995**  
Construction of new generating resources.

**Public Service Commission of Nevada (94-9002) – November 1994**  
Environmental and health impacts of a proposed power plant.

**Nuclear Decommissioning Finance Committee of New Hampshire (93-001) – September 1994**  
Seabrook decommissioning cost, spent fuel storage, and cost collection methodology (joint testimony with William Dougherty).

**Public Service Commission of Wisconsin (6630-CE-197 and 6630-CE-209) – September 1994**

Point Beach externalities, economics, spent fuel storage, and aging (joint testimony with William Dougherty).

**British Columbia Utilities Commission – August 1994**

Greenhouse gas emissions and environmental externalities policy

**Public Service Commission of Wisconsin (05-EI-14) – February 1994**

Cost of decommissioning Point Beach and Kewaunee nuclear power plants. Also, rebuttal and surrebuttal testimony in February.

**Delaware Public Service Commission (91-39) – September 1992**

Nuclear and fossil power plant performance targets.

**Massachusetts Department of Public Utilities (91-131) – December 1991**

Internalization of environmental externalities, greenhouse gas valuation and policy.

**Massachusetts Department of Public Utilities (91-131) – October 1991**

Environmental externalities valuation, emissions effects and global warming.

**Massachusetts Department of Public Utilities ((89-141, 90-73, 90-141, 90-194 and 90-270) – December 1990**

The incorporation of environmental externalities in specific utility RFPs.

**Massachusetts Department of Public Utilities (90-55) – June 1990**

Costs and benefits of high-efficiency gas heating equipment.

**Massachusetts Department of Public Utilities (86-36-G and 89-239) – March 1990**

Environmental externalities of electric resources.

**Florida Public Service Commission (890973-E1) – January 1990**

Integrated energy planning, power plant emissions, and nuclear plant performance.

**Pennsylvania Public Utilities Commission (R-891364) – October 1989**

Generating capacity requirements of the Philadelphia Electric Company and the Pennsylvania-New Jersey-Maryland Interconnection.

**Maryland Public Service Commission (8199) – October 1989**

Performance standards for coal, oil, and nuclear power plants.

**Michigan Public Service Commission (U-9172) – April 1989**

Economic analysis of the Palisades Power Purchase Agreement. Ratepayer impacts, incentives, and implications for plant operation and decommissioning.

**Pennsylvania Public Utility Commission (P-870216, P-880283, P-880284, and P-880286) – March 1989**

Allegheny Power System planning and avoided costs.

**Michigan Public Service Commission (U-8880) – February 1988**

Detroit Edison Company power supply costs, economics of Fermi “buy-back” purchase, nuclear fuel expense, oil costs, and power transactions.

**Michigan Public Service Commission (U-8866) – December 1987**

Consumers Power Company power supply costs, including projections of oil prices and purchased power costs.

**Pennsylvania Public Utility Commission (R-850220) – September 1987**

Economic analysis of West Penn Power Company’s participation in the Bath County Pumped Storage Project, and Allegheny Power System capacity reserve requirements. Also, surrebuttal testimony in October.

**Arizona Corporation Commission (U-1345-85-367) – February 1987**

Palo Verde decommissioning cost.

**Michigan Public Service Commission (U-8545) – December 1986**

Consumers Power Company power costs, projected cost of oil and purchased power, economic evaluation of the Big Rock Point nuclear unit.

**Public Service Commission of Indiana (38045) – November 1986**

Northern Indiana Public Service Company system reliability and excess capacity.

**California Public Utility Commission (84-06-014 and 85-08-025) – July 1986**

Diablo Canyon decommissioning cost and collection issues.

**Michigan Public Service Commission (U-8042R) – June 1986**

Review of Consumers Power Company system operations during 1985 and economic evaluation of the Big Rock Point nuclear unit.

**Michigan Public Service Commission (U-8291) – April 1986**

Detroit Edison Company power supply costs, application of a multi-area dispatch model.

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***A Conservation Investment Scenario for the Northeast Utilities Connecticut Service Area***, ESRG No. 81-12/1, October 1981.

***The Conservation Investment Alternative for New York State***, ESRG No. 80-42, September 1981.

***A Conservation Investment Program for Alabama Power Company***, a report to the Alabama Public Service Commission, ESRG No. 80-62/2, July 1981.

***A Conservation Investment Strategy for Utah Power and Light Company: Cost-Benefit Analysis***, Public Service Commission of Utah, Case No. 80-035-17, ESRG No. 81-06, February 1981.

***The Conservation Alternative to the Power Plant at Shoreham, Long Island***, ESRG No. 80-31, November 1980.

## **PAPERS**

**“2011 Carbon Dioxide Price Forecast,”** Lucy Johnston, Ezra Hausman, Bruce Biewald, Rachel Wilson, and David White, February 11, 2011.

**“Comments Regarding the Department of Energy's Notice of Intent for the Smart Grid Investment Grant Program,”** Rick Hornby, Bob Fagan, and Bruce Biewald, May 6, 2009.

**“Co-Benefits Experience and Lessons from the U.S. Electric Sector,”** Bruce Biewald, Lucy Johnston, and Jeremy Fisher, published in *Pollution Atmosphérique*, April 1, 2009.

**“Synapse 2008 CO<sub>2</sub> Price Forecasts,”** David Schlissel, Lucy Johnston, Bruce Biewald, David White, Ezra Hausman, Chris James, and Jeremy Fisher, July 30, 2008.

**“Nuclear Power Plant Construction Costs,”** David Schlissel and Bruce Biewald, July 30, 2008.

**“Whitepaper on Least Cost Electricity Procurement in Rhode Island,”** Rick Hornby, William Steinhurst, and Bruce Biewald, May 31, 2007.

**“Climate Change and Power: Carbon Dioxide Emissions Costs and Electricity Resource Planning,”** Lucy Johnston, Ezra Hausman, Anna Sommer, Bruce Biewald, Tim Woolf, David Schlissel, Amy Roschelle, and David White, March 2, 2007.

**“Capacity for the Future: Kinky Curves and Other Reliability Options,”** Paul Peterson, David White, Amy Roschelle, and Bruce Biewald, December 20, 2004.

**“Estimating Emission Reductions from Energy Efficiency in the Northeast,”** Bruce Biewald and Geoff Keith, ACEEE 2004 Summer Study, Pacific Grove, CA. August 22-27, 2004.

**“Long-Term Power Contracts: The Art of the Deal,”** Amy Roschelle, William Steinhurst, Paul Peterson, and Bruce Biewald, *Public Utilities Fortnightly*, August 2004.

**“Designing Demand Response Programs in New England to Achieve Air Quality Benefits,”** Geoffrey Keith, Bruce Biewald, and David White, *The Electricity Journal*, May 2004.

**“The 2003 Blackout: Solutions that Won’t Cost a Fortune,”** David White, Amy Roschelle, Paul Peterson, David Schlissel, Bruce Biewald, and William Steinhurst, *The Electricity Journal*, November 2003.

**“Electricity Market Distortions Associated with Inconsistent Air Quality Regulations,”** Tim Woolf and Bruce Biewald, *The Electricity Journal*, April 2000.

**“Grandfathering and coal plant emissions: the cost of cleaning up the Clean Air Act,”** Frank Ackerman, Bruce Biewald, David White, Tim Woolf, William Moomaw, *Energy Policy*, Volume 27, Number 15, December 1999.

**“Follow the Money: A Method for Tracking Electricity for Environmental Disclosure,”** Bruce Biewald, David White, and Tim Woolf, *The Electricity Journal*, May 1999.

**Book Review** of “U.S. Utility Mergers and the Restructuring of the New Global Power Industry,” in *Energy*, October 1998.

**“Implications of Premature Nuclear Plant Closures: Funding Shortfalls for Nuclear Plant Decommissioning and Spent Fuel Transportation and Storage,”** Bruce Biewald and David White, prepared for the United States Association for Energy Economics and International Association for Energy Economics, 19<sup>th</sup> Annual North American Conference, Albuquerque, NM, October 1998.

**“Efficiency, Renewables and Gas: Restructuring as if Climate Mattered,”** Tim Woolf and Bruce Biewald, *The Electricity Journal*, January/February 1998.

**“Green Electricity: Tracking Systems for Environmental Disclosure,”** B. Biewald and J.A. Ramey, proceedings of WINDPOWER '97, the American Wind Energy Association's annual conference in Austin, Texas, forthcoming.

**“Competition and Clean Air: The Operating Economics of Electricity Generation,”** *The Electricity Journal*, January/February 1997.

**“Electric Industry Restructuring and Environmental Sustainability,”** proceedings of the United States Association for Energy Economics and International Association for Energy Economics, 17<sup>th</sup> North American Conference on (De)regulation of Energy, Boston, October 1996.

**“Residential Real-Time Metering Technology for Electricity Restructuring,”** Daljit Singh and Bruce Biewald, presented at the National Training and Information Center conference, Chicago, September 1996.

**“Competition and Environmental Impacts in the U.S. Electric Sector: Must Market Forces be Tamed?,”** presented at the International Society of Ecological Economics conference, Boston, August 1996.

**“Stranded Risk: Nuclear Power Issues in Electricity Restructuring,”** for Energy Advocates meeting in Austin, Texas, May 1996.



**"Counting the Costs: Scientific Uncertainty and Valuation Perspective in EXMOD,"** Stephen Bernow, Bruce Biewald, William Dougherty, and David White, presented at technical meeting of the International Atomic Energy Agency, Vienna, Austria, December 4-8, 1995.

**"Environmentally Targeted Objectives for Reducing Acidification in Europe,"** *Energy Policy*, C.A. Gough, P.D. Bailey, B. Biewald, J.C.I. Kuylenstierna and M.J. Chadwick, December 1994.

**"Environmental Externalities: Highways and Byways,"** NRRI Quarterly Bulletin, Vol. 15 No. 4, Bruce Biewald, Paul Chernick and Bill Steinhurst, December 1994. Also presented at NARUC's 5th National Conference on Integrated Resource Planning, Kallispell, Montana, May 15-18, 1994.

**"From Social Costing to Sustainable Development: Beyond the Economic Paradigm,"** Stephen Bernow, Bruce Biewald, and Paul Raskin, in *Social Costs of Energy: Present Status and Future Trends*, Proceedings of an International Conference held at Racine, Wisconsin, September 8-11, 1992. Edited by Olav Hohmeyer and Richard Ottinger. Published by Springer-Verlag, September 1994.

**"Modeling Renewable Electric Resources: A Case Study of Wind,"** Stephen Bernow, Bruce Biewald, Daljit Singh, and Jeff Hall, proceedings of the Ninth NARUC Biennial Regulatory Information Conference, Columbus, OH, September 7-9, 1994.

**"Alternative Closed Cycle Cooling Systems for Power Plants: A Framework of Evaluation in Integrated Resource Planning,"** Daljit Singh and Bruce Biewald, in the proceedings of the Ninth NARUC Biennial Regulatory Information Conference, Columbus, OH. September 7-9, 1994.

**"Misconceptions, Mistakes and Misnomers in DSM Cost-Effectiveness Analysis, Or What Do You Really Mean By T.R.C.?"** Mark Fulmer and Bruce Biewald, ACEEE 1994 Summer Study, Pacific Grove, CA. August 28 - Sept. 2, 1994.

**"Modeling Renewable Electric Resources: A Case Study of Wind Power,"** Stephen Bernow, Bruce Biewald, and Daljit Singh, presented at WINDPOWER 1994, Sponsored by American Wind Energy Association, Minneapolis, Minnesota, May 9-13, 1994.

**"National Climate Change Policy and Clean Air Act Compliance: A Case Study of Combined CO<sub>2</sub>/SO<sub>2</sub> Reduction,"** Stephen Bernow, Bruce Biewald, Mark Fulmer, Tim Woolf, Kristen Wulfsberg, and Barry Solomon, in the proceedings of NARUC's 5th National Conference on Integrated Resource Planning, Kallispell, Montana, May 15-18, 1994.

**"Modeling Renewable Electric Resources: A Case Study of Wind Reliability,"** Stephen Bernow, Bruce Biewald, and Daljit Singh, presented at the NARUC-DOE National Regulatory Conference on Renewable Energy, Savannah, Georgia, October 3-6, 1993.

**"Environmental Sustainability as a Goal in Resource Planning and Policy,"** Stephen Bernow and Bruce Biewald, Office of Technology Assessment workshop, Washington, DC. April 1993.

**"Climate Change and the U.S. Electric Sector,"** Bruce Biewald and Stephen Bernow, presented at NARUC's 4th National Conference on Integrated Resource Planning, Burlington, Vermont, September 1992.

**"Coordinating Clean Air Act Compliance with Integrated Resource Planning: The Role of Externalities,"** Stephen Bernow, Bruce Biewald, and Kristin Wulfsberg, the Eighth NARUC Biennial Regulatory Information Conference, Ohio State University, Columbus, Ohio. September 9-11, 1992.

**"Direct Environmental Impacts of Demand-Side Management,"** Stephen Bernow, Frank Ackerman, Bruce Biewald, Mark Fulmer, Karen Shapiro, and Kristin Wulfsberg, American Council for an Energy Efficient Economy (ACEEE) 1992 Summer Study, September 1992.

**"Modeling Fuel Cycle and Site-Dependent Environmental Impacts in Electric Resource Planning,"** Stephen Bernow and Bruce Biewald, invited paper at OECD-IEA Expert Workshop on Life-Cycle Analysis of Energy Systems, Paris, France, May 18 and 19, 1992. Proceedings published OECD/IEA Paris, 1993.

**"Computer Model Use in Energy Conservation Planning,"** presented at the Latin American Energy Organization (OLADE) Seminar on Power Systems Computer Modeling in Quito, Ecuador, September 23-25, 1991.

**"Environmental Externalities Measurement: Quantification, Valuation and Monetization,"** Bernow, Biewald and Marron, in External Environmental Costs of Electric Power, proceedings of a German-American workshop, Ladenburg, FRG, October 23-25, 1991. Edited by Olav Hohmeyer and Richard Ottinger, published by Springer-Verlag (Berlin, Heidelberg, New York).

**"Some Microcomputer Tools for Least Cost Integrated Energy Planning: ECO, LEAP and EDB,"** Bruce Biewald and Harvey Salgo, presented at workshop on Energy Pricing and Planning, Bratislava, Czechoslovakia, May 21-22, 1991.

**"Confronting Uncertainty: Contingency Planning for Decommissioning,"** Bruce Biewald and Stephen Bernow, Chapter 18 of "Nuclear Decommissioning Economics," a special issue of *The Energy Journal* of the International Association for Energy Economics, Vol.12, March 1991.

**"Avoided Emissions and Environmental Dispatch,"** Stephen Bernow and Bruce Biewald, presented at the Conference on "Demand-Side Management and the Global Environment," Arlington, Virginia, April 22-23, 1991.

**"Environmental Benefits of DSM in New York: Long Island Case Study,"** Bruce Biewald and Stephen Bernow, presented at the Conference on "Demand-Side Management and the Global Environment," Arlington, Virginia, April 22-23, 1991.

**"Full Cost Dispatch: Incorporating Environmental Externalities in Electric System Operation,"** Stephen Bernow, Bruce Biewald and Donald Marron, the *Electricity Journal*, March 1991.

**"EDB: A Flexible Database System for Energy-Environmental Analysis,"** Bruce Biewald, Michael Lazarus, and David Von Hippel, presented at International Atomic Energy Agency (IAEA) Technical Committee Meeting on "Development of a Database for Comparative Health and Environmental Impacts of Various Energy Systems," in Vienna, Austria, October 15-19, 1990.

**"Full Cost Economic Dispatch: Recognizing Environmental Externalities in Electric Utility System Operation,"** Stephen Bernow, Bruce Biewald, and Donald Marron, presented at NARUC Conference on Externalities, Jackson Hole, Wyoming, October 1990.

**"An Assessment of Demand-Side Management Models and Their Use and Applicability in Canadian Utilities,"** Martin Adelaar and Bruce Biewald, in the proceedings of the Canadian Electrical Association Demand-Side Management Conference, Halifax, Nova Scotia, September 1990.

**"Avoided Cost Contracts Can Undermine Least Cost Planning,"** Stephen Bernow, Bruce Biewald, and Donald Marron, *Energy Policy*, September 1990.

**"Environmental Externalities Measurement: Quantification, Valuation, and Monetization,"** Stephen Bernow, Bruce Biewald, and Donald Marron, in the proceedings of the Seventh NARUC Biennial Regulatory Information Conference, September 1990.

**"Do We Really Need Nuclear Generating Companies?,"** Public Utilities Fortnightly, June 7, 1990.

**"Nuclear Power Economics: Construction, Operation and Disposal,"** Bruce Biewald and Donald Marron, March 1989.

**"Electric Utility System Reliability Analysis: Determining the Need for Generating Capacity,"** Stephen Bernow and Bruce Biewald, in the proceedings of the Sixth NARUC Biennial Regulatory Information Conference, September 1988.

**"Nuclear Power Plant Decommissioning: Cost Estimation for Power Planning and Ratemaking,"** Stephen Bernow and Bruce Biewald, Public Utilities Fortnightly, October 29, 1987.

**"Cost and Performance of Boiling Water Reactors,"** Stephen Bernow, Bruce Biewald and Tim Woolf, Public Utilities Fortnightly, August 1987.

## **PRESENTATIONS**

(Note: Presentations that were accompanied by a written paper are listed in the section for "papers," above.)

"The U.S. Power System: Economic and Regulatory Challenges to Reducing Greenhouse Gas Emissions from the World's Largest Machine," presentation at Design Continuum, December 3, 2008.

"Economics of Electric Sector CO<sub>2</sub> Emissions Reduction: Making Climate Change Policy that People Can Live With," presentation at the NASUCA 2008 Annual Meeting, November 18, 2008.

"Selected Topics from Avoided Energy Supply Costs in New England 2007 Final Report," presentation at a MA DPU Technical Session, July 29, 2008.

"Prudent Planning and New Coal-Fired Generation," presentation at the CERES 2008 Conference, April 29, 2008.

"Climate Change Policies in the Northeast - Carbon Emission Caps and Energy Cost," presentation at the ASHRAE Winter Meeting, prepared for the American Society of Heating, Refrigerating and A/C Engineers, January 19, 2008.

“Efficiency and Renewable Energy for Carbon Constrained Electric Systems 2007,” presentation at the NASUCA Annual Meeting, Anaheim, California, prepared for National Association of State Utility Consumer Advocates, November 12, 2007.

“Air Emissions Issues Associated DER in the Mid-Atlantic Region,” presentation at the Mid-Atlantic State Energy and Environment Workshop on Distributed Energy Resources, September 27, 2007.

“Exploration of Costs for Load Side and Supply Side Carbon Caps for California,” presentation at the Joint En Banc Hearing of PUC and CEC on Point of Regulation in the Electricity Sector (R.06-04-009), prepared for Regulatory Assistance Project, and California Public Utilities Commission, August 21, 2007.

“Portfolio Management: Tools and Practices for Regulators,” presentation at the NARUC 2006 Summer Meeting in San Francisco, California, and for the Annual Convention in Miami, Florida, prepared for the National Association of Regulatory Utility Commissioners, July 2006 and November 2006.

“Electricity Price Increases: Causes, Effects, and Solutions,” presentation at the Restructuring Roundtable, May 19, 2006.

“Forecasting and Using Carbon Prices in a World of Uncertainty,” presentation to Electric Utilities Environmental Conference in Tucson, Arizona on January 22, 2006.

“Energy Efficiency in the Northeast,” presentation at ACEEE National Conference on Energy Efficiency as a Resource, Berkeley, CA, September 27, 2005.

“The Shape of Things to Come: Incorporating Unproven Reserves of Efficiency Savings into Energy Models,” presentation to the East Coast Energy Group, Washington, DC, November 10, 2004.

“Displaced Emissions from Renewables and Efficiency in the Northeast United States,” presentation at a workshop convened by the Commission for Environmental Cooperation, the US Environmental Protection Agency, and the World Resources Institute, Washington DC, November 4, 2004.

“Electric Transmission Technical and Policy Issues,” presentation at National Association of State Utility Consumer Advocates conference in Austin, Texas, June 14, 2004.

“Incorporating Renewable Generation into a Risk Management Strategy,” presentation at the New England Conference of Public Utility Commissioners Symposium, Brewster, Massachusetts, May 25, 2004.

“Electricity Portfolio Management,” presentation at Illinois State University Institute for Regulatory Policy Studies Conference on “Beyond 2006,” Springfield, Illinois, May 20, 2004.

“Electricity Risk Management: Diversified Resource Portfolios,” presentation at Electric Power Supply Association Meeting, Washington, D.C., May 6, 2004.

“Quantifying Emission Reductions from Local Government Actions,” presentation to Metropolitan Washington Council of Governments Energy and Air Quality Conference, Washington DC, April 5, 2004.

“Electricity Portfolio Management,” presentation to National Association of Regulatory Utility Commissioners’ conference in Washington, D.C., March 9, 2004.

“Portfolio Management for Electricity,” presentation at the Regulatory Assistance Project’s workshop on portfolio management, Chicago, September 18, 2003.

“Issues in Estimating Electric System Displaced Emissions,” presentation at the Commission for Environmental Cooperation Technical Meeting on Approaches to Estimating Environmental Benefits of Renewable Energy and Energy Efficiency, Washington, DC, July 27, 2003.

“Best Practices in Market Monitoring and Mitigation,” presented at the National Association of State Utility Consumer Advocates Mid-Year Meeting in Austin, Texas, June 16, 2002.

“Regulation of Waste Management at Large Electric Utilities: Modeling Industry Impacts,” US Environmental Protection Agency, August 7, 2001.

“Quality of Service in Performance-Based Regulation: US Experiences,” presented at the Seminar on Regulation of Electricity Supply Quality, Milan, Italy, June 8, 2001.

“Demand Response in Electricity Markets,” presented at the National Association of State Utility Consumer Advocates Mid-Year Meeting in Santa Fe, New Mexico, June 18, 2001.

Presentation on “Repowering the Midwest: The Clean Energy Development Plan for the Heartland,” at the National Wind Coordinating Committee Upper Midwest Transmission Workshop, Minneapolis, Minnesota, May 1, 2001.

“Observations on New England’s Electricity Markets,” National Regulatory Research Institute Market Power Conference, Columbus, Ohio, April 10, 2001.

Presentation on “Derailing Coal: The Economics of Coal-Fired Electricity Generation in the U.S.,” Tax Shift Strategy Meeting, Washington, D.C., December 2, 2000.

Presentation on “Repowering the Midwest: A Clean Energy Development Plan for the Heartland,” presentation with Howard Learner at the National Association of Regulatory Utility Commissioners Annual Meeting, San Diego, California, November 14, 2000.

Presentation on “Electricity in New England: Market Imperfections of Failure?” at National Association of State Utility Consumer Advocates Annual Meeting, San Diego, California, November 13, 2000.

Presentation on “How Green is Green? Verifying Energy Advertising Claims,” at the New England Conference of Public Utility Commissioners Symposium, Bretton Woods, New Hampshire, May 25, 1999.

Presentation on “Consumer Perspectives on Market Power – Case Studies from New England, New York, PJM, and Mississippi,” IBC Conference on Market Power, Washington DC, May 24, 1999.

Presentation on “Grandfathering and Environmental Comparability,” at the National Association of Regulatory Utility Commissioners 1998 Summer Committee Meetings, Seattle, July 26, 1998.

Presentation on “Tracking Electricity in the New England Market,” at the National Association of Regulatory Utility Commissioners 1998 Summer Committee Meetings, Seattle, July 26, 1998.

Presentation on “Tracking Electricity in the New England Electricity Market,” at the National Council on Competition and the Electricity Industry National Executive Dialogue on Customers’ Right to Know, Chicago, May 13, 1998.

Presentation on “Comparable Environmental Regulations in a Restructured Electricity Industry: The Grandfathering Effect,” National Association of Regulatory Utility Commissioners meeting in Washington, D.C., March 1, 1998.

Presentation on “Market Power in Electricity Generation,” National Consumer Law Center Conference, Washington, D.C., February 9, 1998.

Presentation on “Electricity Market Power in New England,” Massachusetts Electric Industry Restructuring Roundtable, Boston, December 15, 1997.

Presentation on wind power development and air quality, National Wind Coordinating Committee New England Wind Issues Forum, Boston, November 7, 1997.

Invited speaker on market power, National Association of State Utility Consumer Advocates meeting in Boston, November 12, 1997.

Presentation on “Distortions to Future and Current Competitive Electric Energy Markets Due to Grandfathering Environmental Regulations of Electric Power Plants,” National Association of Regulatory Utility Commissioners meeting in Boston, November 9, 1997.

Presentation on “Electric Industry Restructuring as if the Environment Mattered,” Boston Area Solar Energy Association, October 9, 1997.

Invited speaker on “Modeling Market Power in Electricity Generation,” National Association of Regulatory Utility Commissioners meeting in San Francisco, July 22, 1997.

Presentation on “Performance-Based Regulation in a Restructured Electric Industry,” National Association of Regulatory Utility Commissioners meeting in San Francisco, July 20, 1997.

Presentation on “State Initiatives and Regional Issues,” New England Governors’ Conference Workshop on Restructuring and Environmentally Sustainable Technologies, Warwick, Rhode Island, March 25, 1997.

Invited speaker on stranded costs, National Association of State Utility Consumer Advocates meeting in San Francisco, November 1996.

Presentation on “Nuclear Power Plant Decommissioning Costs and Electricity Restructuring,” Nuclear Decommissioning Trusts conference, New York City, November 18, 1996.

Invited speaker on stranded costs, Indiana Utilities Regulatory Commission Forum, Indianapolis, November 1, 1996.

Presentation on “Electric Industry Restructuring and the Environment,” at the Indiana Energy Conference, Indianapolis, Indiana, October 10, 1996.

Presentation on "Small Customers in a Restructured Electricity Industry: Transaction Costs, Advanced Metering Technologies and Aggregation Options" to the Consumers' Energy Conference, South Portland, Maine, July 1996.



Presentation on "Electric Generation Market Power in New England" to New England Conference of Public Utility Commissioners, Manchester Village, Vermont, May 1996.

Presentation on "Advanced Metering for Residential Customers on Electricity Restructuring" to National Consumer Law Center's 10th Annual Conference in Washington, DC, February 1996.

Presentations on "Market Power," "Environmental Aspects of Restructuring" and "Market Access for Small Customers" to Vermont Public Service Board workshops on electricity restructuring, January and February 1996.

Presentation on "Environmental Impacts of Energy: Sustainability and Social Costing" to British Columbia Utilities Commission Workshop, Vancouver, BC, March 1995.

Presentation on "Competition and Economic Efficiency" to the National Council on Competition and the Electric Industry, December 1995.

Presentation on "Compliance Planning Under Regulatory Uncertainty," to EPA "Opportunities Conference: Energy Efficiency and Renewable Energy," Washington, DC, June 1993.

Presentation on "Energy and Sustainability" to Hydro-Quebec Conference, Hampshire College, Amherst, Massachusetts, April 1993.

Invited Speaker on environmental externalities, ASME "ECO World" conference in Washington, DC, June 1992.

Invited Speaker, Association of Energy Engineers, Boston, Massachusetts, February 1992.

Presentation of Acid Rain Abatement Optimization Model to the Swedish Environmental Protection Agency, Solna, Sweden, November 1991.

Presentation on Integrated Resource Planning to Boston Gas Company, July 1990.

Training on Methods for Calculating Electric System Avoided Costs, provided to energy planners and policy makers from five Southeast Asian countries sponsored by U.S. Agency for International Development and administered by the Institute of International Education, May 1990.

Invited Speaker, National Association of State Utility Consumer Advocates (NASUCA) Mid-Year Meeting, Annapolis, Maryland, and June 1988.

Invited Speaker, Conference on New Developments in Nuclear Decommissioning Costs and Funding Methods, sponsored by the Northeast Center for Professional Education, Washington, DC, April 1988.

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