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**Affiliate**

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Mr. Frame has consulted with electric utility clients on a variety of matters, including industry restructuring, retail competition, wholesale bulk power markets and competition, market power and mergers, transmission access and pricing, contractual terms for wholesale service, and contracting for non-utility generation. A substantial portion of this work has been in conjunction with litigated antitrust and federal and state regulatory proceedings.

Mr. Frame frequently speaks before electric industry groups on competition-related topics. He has testified in federal and local courts and before federal and state regulatory commissions, the Armed Services Board of Contract Appeals and the Commerce Commission of New Zealand.

Mr. Frame was previously a Managing Principal at Analysis Group and, prior to joining Analysis Group, he was a Vice President at National Economic Research Associates. Mr. Frame graduated from George Washington University and pursued graduate work there under a National Science Foundation Traineeship. His areas of specialization were public finance and urban economics. He completed all requirements for his Ph.D. degree in economics with the exception of the thesis.

**EDUCATION**

1970	B.B.A., George Washington University
1970 - 73	Ph.D. coursework (all requirements for degree in economics completed except thesis), George Washington University

**PROFESSIONAL EXPERIENCE**

1998 -	Analysis Group <i>Affiliate, 2011-</i> <i>Managing Principal, 1998-2011</i>
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- 1984 - 1998      National Economic Research Associates  
*Vice President and Senior Consultant.* Participated in projects dealing with retail competition, wholesale competition, market power assessment and determination of relevant markets for electricity supply, electric utility mergers, transmission access and pricing, partial requirements ratemaking, contractual terms for wholesale service, and contracting for non-utility generation supplies. Principal clients were investor-owned electric utilities.
- 1975 - 1984      Transcomm, Inc.  
*Senior Economist.* Worked on a variety of projects concerning market structure, pricing and cost development in regulated industries. Clients included the U.S. Departments of Commerce, Defense and Energy, the Nuclear Regulatory Commission, the State of Oregon, bulk mailers and various communications equipment manufacturers and service providers. Participated in numerous federal and state regulatory proceedings and was principal investigator for a multi-year Department of Energy study addressing various aspects of electric utility competition.
- 1974 - 1975      *Independent Economic Consultant*  
Advised telephone equipment manufacturers concerning cost and rate development for competitive telephone offerings, analyzed alternative travel agent compensation arrangements and examined nonbank activity by bank holding company firms.
- 1973 - 1974      Program of Policy Studies in Science and Technology  
*Research Staff*
- 1973              Urban Institute  
*Research Staff*

## TESTIFYING EXPERIENCE

- Affidavit on behalf of affiliates of MidAmerican Energy Holdings Company, before the Federal Energy Regulatory Commission in Docket No. EC-13-1, providing a competitive assessment of MEHC's proposed acquisition of the Alta Wind VII and Alta Wind IX Facilities, October 1, 2012.
- Direct Testimony on behalf of FirstEnergy Solutions Corp, before the Ohio Public Utilities Commission in Case No. 11-346-EL-SSO, assessing the implications of the AEP Pool Agreement for the implementation of a competitive-based procurement by AEP for its standard offer service supply in Ohio, May 4, 2012.
- Affidavit on behalf of Topaz Solar Farms LLC, before the Federal Energy Regulatory Commission in Docket No. ER12-1626, providing market screen analyses to support Topaz Solar Farms' application for market-based rate authority, April 26, 2012.
- Affidavit on behalf of MidAmerican Energy Holdings Company, before the Federal Energy Regulatory Commission in Docket No. EC12-61, providing a competitive assessment of MEHC's proposed acquisition of the Bishop Hill II wind facility, January 20, 2012.

- Affidavit on behalf of ALLETE, Inc., with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket Nos. ER01-2636 and ER10-2819, providing updated market screen analyses for the Central region, December 30, 2011.
- Affidavit on behalf of Plum Point Energy Associates, LLC and Plum Point Services Company, LLC, with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket Nos. ER11-2734 and ER11-2335, providing updated market screen analyses for the Southeast region, December 29, 2011.
- Affidavit on behalf of Orlando CoGen Limited, L.P. and Vandolah Power Company, L.L.C., with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket Nos. ER10-2218 and ER10-2211, providing updated market screen analyses for the Southeast region, December 28, 2011.
- Affidavit on behalf of MidAmerican Energy Holdings Company in Docket No. EC12-52, providing a competitive assessment of MEHC's proposed acquisition of a 49 percent interest in the Agua Caliente solar generating facility, December 15, 2011.
- Affidavit on behalf of various affiliates of MidAmerican Energy Holdings Company, before the Federal Energy Regulatory Commission in Docket No. ER11-3876 *et al.*, providing (i) updated triennial market screen analyses for the Central region and (ii) change in status market screen analyses reflecting 1,001 MW of new wind generation consisting of the Pomeroy IV, Laurel, Rolling Hills, Eclipse, Morninglight and Vienna projects, November 17, 2011.
- Affidavit on behalf of various affiliates of Southern Company, before the Federal Energy Regulatory Commission in Docket No. ER10-2881 *et al.*, providing supplemental updated triennial market screen analyses for the Southeast region, November 4, 2011.
- Affidavit on behalf of PacifiCorp, before the Federal Energy Regulatory Commission in Docket No. ER10-3246 *et al.*, providing change in status DPT and other analyses to support continued market-based pricing by PacifiCorp after acquisition by contract of the West Valley generating station, October 7, 2011.
- Affidavit on behalf of PacifiCorp, before the Federal Energy Regulatory Commission in Docket No. ER10-3246 *et al.*, providing change in status market screen analyses to support continued market-based pricing by PacifiCorp after acquisition by contract of the West Valley generating station, September 14, 2011.
- Affidavit on behalf of various affiliates of Southern Company, before the Federal Energy Regulatory Commission in Docket No. ER10-2881 *et al.*, providing updated triennial market screen analyses for the Southeast region, June 30, 2011.
- Affidavit on behalf of FirstEnergy Operating Companies *et al.*, before the Federal Energy Regulatory Commission in Docket No. ER10-2727 *et al.*, providing updated change in status market screen analyses reflecting the merger of FirstEnergy and Allegheny and ATSI's transfer from the Midwest ISO to PJM, June 30, 2011.
- Affidavit on behalf of various affiliates of MidAmerican Energy Holdings Company, before the Federal Energy Regulatory Commission in Docket No. ER11-3876 *et al.*, providing updated triennial market screen analyses for the Northeast region, June 30, 2011.

- Affidavit on behalf of Astoria Energy LLC and Astoria Energy II LLC, with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket Nos. ER10-2253 and ER10-3319, providing updated triennial market screen analyses for the Northeast region, June 29, 2011.
- Affidavit on behalf of various affiliates of EIF, with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket No. ER10-2480 *et al.*, providing updated triennial market screen analyses for the Northeast region, June 30, 2011.
- Affidavit on behalf the FirstEnergy Operating Companies *et al.*, before the Federal Energy Regulatory Commission in Docket Nos. ER01-1403 *et al.*, applying the Commission's pivotal supplier and market share screens to FirstEnergy, December 29, 2010.
- Additional Testimony on behalf of MidAmerican Energy Company, before the Iowa State Utilities Board in Docket No. RPU-2009-0003, providing updated analyses addressing competitive issues raised in conjunction with MidAmerican's proposed Wind VII project, December 1, 2010.
- Affidavit on behalf of Astoria Energy II LLC, with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket No. ER10-3319, providing indicative screen analyses in support of Astoria II's request for market-based rate authority, September 30, 2010.
- Affidavit on behalf of PacifiCorp, before the Federal Energy Regulatory Commission in Docket No. ER97-2801 *et al.*, providing updated market screen and delivered price test analyses for the Northwest region, June 30, 2010.
- Affidavit on behalf of Idaho Power Company, before the Federal Energy Regulatory Commission in Docket No. ER97-1481-013, providing updated market screen analyses for the Northwest region, June 30, 2010.
- Affidavit on behalf of Lea Power Partners, LLC, with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket No. ER07-751-002, providing updated market screen analyses for the Southwest Power Pool region, March 1, 2010.
- Affidavit on behalf of Northeastern Power Company, with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket No. ER10-720-000, providing indicative screen analyses in support of NEPCO's request for market-based rate authority, February 4, 2010.
- Affidavit on behalf of various affiliates of Covanta Energy Corporation, with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket Nos. ER10-395-000, ER10-409-000 and ER10-410-000, providing indicative screen analyses in support of Covanta affiliates' requests for market-based rate authority, February 1, 2010.
- Affidavit on behalf of Denver City Energy Associates, L.P., with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket No. ER97-4084-011, providing updated market screen analyses for the Southwest Power Pool region, December 22, 2009.
- Affidavit on behalf of Kleen Energy Systems, LLC, with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket No. ER10-308-000, providing indicative screen analyses in support of Kleen's request for market-based rate authority and in support of continued market-based pricing for EIF affiliates after the addition of the Kleen facility, November 25, 2009.

- Expert Report on behalf of Sho-Me Power Electric Cooperative, before the Armed Services Board of Contract Appeals in Case ASBCA No. 56640, comparing Sho-Me's charges to Fort Leonard Wood for full requirements electric service under its Conservation Tariff to market-based prices for full-requirements service, November 11, 2009.
- Affidavit on behalf of Southern Power Company *et al.*, before the Federal Energy Regulatory Commission in Docket No. EC10-15-000, addressing competitive issues raised by the proposed swap of generating capacity whereby Southern Power would acquire the West Georgia generating facility now owned by affiliates of LS Power Development, and LS Power Development would acquire the DeSoto generating facility now owned by Southern Power, November 2, 2009.
- Affidavit on behalf of PacifiCorp, before the Federal Energy Regulatory Commission in Docket No. ER97-2801 *et al.*, providing updated delivered price test and other analyses in support of continued market-based pricing by PacifiCorp after capacity changes to its existing generator fleet and after commercial operation of its new High Plains and McFadden Ridge wind generating facilities, October 2, 2009.
- Answering Testimony on behalf of NV Energy, Public Service Company of New Mexico and Tucson Electric Power Company, before the Federal Energy Regulatory Commission in Docket No. EL02-71, addressing whether a putative failure to file proper and timely quarterly transaction reports masked an accumulation of market power by NVE, PNM and/or TEP, September 17, 2009.
- Rebuttal Testimony on behalf of J.P. Morgan Energy Ventures Corporation, before an arbitration panel in TAQA GEN X LLC (f/k/a BE Red Oak LLC), Ref. No. 16 198 001 80 09, addressing regulatory policy and other issues raised by respondents in a dispute involving the assignment of station power costs under a long-term tolling agreement, July 24, 2009.
- Surrebuttal Testimony on behalf of MidAmerican Energy Company, before the Iowa State Utilities Board in Docket No. RPU-2009-0003, addressing competitive issues raised in conjunction with MidAmerican's proposed ratemaking principles for its Wind VII project, July 17, 2009.
- Direct Testimony on behalf of J.P. Morgan Energy Ventures Corporation, before an arbitration panel in TAQA GEN X LLC (f/k/a BE Red Oak LLC) v. AES RED OAK, L.L.C., Ref. No. 16 198 00180 09, addressing regulatory issues relating to the assignment of station power costs in a long term tolling agreement, July 2, 2009.
- Affidavit on behalf of Southern Company Services, Inc. *et al.*, before the Federal Energy Regulatory Commission in Docket No. ER96-780 *et al.*, in support of continued market-based pricing by Southern Company affiliates after its acquisition by purchase of additional generating capacity, June 30, 2009.
- Affidavit on behalf of various affiliates of MidAmerican Energy Holdings Company, before the Federal Energy Regulatory Commission in Docket No. ER99-2156 *et al.*, requesting that their existing market-based rate authority be extended to include the MidAmerican BAA, May 15, 2009.
- Affidavit on behalf of Southern Power Company, before the Federal Energy Regulatory Commission in Docket No. EC09-70, addressing competitive issues raised by Southern Power's proposed acquisition of Hartwell Energy Limited Partnership, April 20, 2009.

- Affidavit on behalf of Minnesota Power, with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket No. ER01-2636, providing updated market screen analyses for the Central region, December 31, 2008 and February 6, 2009.
- Affidavit on behalf of various affiliates of Northern Star Generation, with Donna Lau Brooks, before the Federal Energy Regulatory Commission in Docket No. ER06-1265 *et al.*, providing updated market screen analyses for the Southeast region, December 30, 2008.
- Affidavit on behalf of the FirstEnergy Operating Companies *et al.*, before the Federal Energy Regulatory Commission in Docket No. ER01-1403 *et al.*, providing updated market screen analyses for the Central region, December 29, 2008.
- Affidavit on behalf of various affiliates of Ameren, before the Federal Energy Regulatory Commission in Docket No. ER00-3412 *et al.*, providing updated market screen analyses for the Central region, December 24, 2008.
- Affidavit on behalf of MidAmerican Energy Holdings Company, before the Federal Energy Regulatory Commission in Docket No. ER99-2156 *et al.*, applying the Commission's pivotal supplier and market share screen to MidAmerican in the Central region, December 3, 2008.
- Affidavit on behalf of MidAmerican Energy Holdings Company, before the Federal Energy Regulatory Commission in Docket No. EC09-26-000, providing competitive analyses supporting MidAmerican's proposed acquisition of the West Valley Project, December 2, 2008.
- Affidavit on behalf of West Valley Holdings, LLC, before the Federal Energy Regulatory Commission in Docket No. ER09-352-000, providing competitive analyses supporting West Valley's application for market-based rate authority, December 2, 2008.
- Affidavit on behalf of Safe Harbor Holding Company, LLC, before the Federal Energy Regulatory Commission in Docket No. ER09-318-000, providing competitive analyses supporting Safe Harbor's application for market-based rate authority, November 24, 2008.
- Affidavit on behalf of MidAmerican Energy Holdings Company, before the Federal Energy Regulatory Commission in Docket No. EC09-25-000, providing competitive analyses associated with MidAmerican's proposed acquisition of an interest in Safe Harbor Water Power Corporation, November 23, 2008.
- Affidavit on behalf of Southern Company Services, Inc., before the Federal Energy Regulatory Commission in Docket No. ER09-88-000, providing assessment of proposed energy auction mechanism as a means to mitigate perceived market power concerns, October 17, 2008.
- Affidavit on behalf of PacifiCorp, before the Federal Energy Regulatory Commission in Docket No. ER97-2801 *et al.*, providing updated delivered price test and other analyses in support of continued market-based pricing by PacifiCorp after its acquisition of new generation capacity and after commercial operation of new generating facilities, October 15, 2008.
- Affidavit on behalf of MidAmerican Energy Holdings Company, before the Federal Energy Regulatory Commission in Docket No. EC09-6, addressing competitive issues raised by MEHC's proposed merger with Constellation Energy Group, October 14, 2008.

- Additional Affidavit on behalf of the FirstEnergy Operating Companies *et al.*, before the Federal Energy Regulatory Commission in Docket No. ER01-1403 *et al.*, providing revised pivotal supplier and market share screen analyses to reflect updated simultaneous import limit values, September 2, 2008.
- Additional Affidavit on behalf of Public Service Electric and Gas Company *et al.*, before the Federal Energy Regulatory Commission in Docket No. ER99-3151 *et al.*, providing revised indicative screen and DPT analyses to reflect updated simultaneous import limit values, and assessing the need for additional market power mitigation measures, September 2, 2008.
- Affidavit on behalf of various affiliates of Southern Company, before the Federal Energy Regulatory Commission in Docket No. ER96-780 *et al.*, providing updated indicative screen analyses, September 2, 2008.
- Affidavit on behalf of Berkshire Power Company, LLC and Waterside Power, LLC, before the Federal Energy Regulatory Commission in Docket Nos. ER99-3502-000 and ER02-1884-000, applying the Commission's pivotal supplier and market share screens, June 30, 2008.
- Affidavit on behalf of Astoria Energy LLC, before the Federal Energy Regulatory Commission in Docket No. ER01-3103, applying the Commission's pivotal supplier and market share screens, June 30, 2008.
- Affidavit on behalf of MidAmerican Energy Holdings Company, before the Federal Energy Regulatory Commission in Docket No. ER96-719-002 *et al.*, applying the Commission's pivotal supplier and market share screens, June 30, 2008.
- Affidavit on behalf of Black River Generation, LLC and Northbrook New York, LLC, before the Federal Energy Regulatory Commission in Docket Nos. ER04-617-003 and ER99-3911-006, applying the Commission's pivotal supplier and market share screens, June 2, 2008.
- Affidavit on behalf of PacifiCorp, before the Federal Energy Regulatory Commission in Docket No. EC08-82, concerning competitive issues raised by PacifiCorp's proposed acquisition of Chehalis Power Generating, LLC, April 29, 2008.
- Affidavit on behalf of PacifiCorp, before the Federal Energy Regulatory Commission in Docket No. ER97-2801 *et al.*, providing updated indicative horizontal market power screen, delivered price test and other analyses to support continued market-based pricing by PacifiCorp after its acquisition by contract of new generation capacity and after commercial operation of certain new generating facilities, March 31, 2008.
- Supplemental affidavit on behalf of the FirstEnergy Operating Companies *et al.*, before the Federal Energy Regulatory Commission in Docket No. ER01-1403 *et al.*, responding to intervenor arguments supporting certain adjustments to previously-submitted horizontal market power screen analyses, March 31, 2008.
- Affidavit on behalf of Idaho Power Company, before the Federal Regulatory Commission in Docket No. ER97-1481, updating Idaho Power's market screen analysis to reflect the addition of its new Danskin No. 1 generator, March 21, 2008.

- Affidavit on behalf of various affiliates of Southern Company, before the Federal Energy Regulatory Commission in Docket No. ER96-780 *et al.*, providing updated market screen analyses to support continued market-based pricing by those affiliates after the operation of Southern Power Company's new Franklin 3 generating facility, February 11, 2008.
- Affidavit on behalf of Public Service Electric and Gas Company *et al.*, before the Federal Energy Regulatory Commission in Docket No. ER99-3151 *et al.*, applying the Commission's pivotal supplier and market share screens to Public Service Electric and Gas Company and its affiliates, providing a delivered price test analysis for PJM East and assessing the need for additional market power mitigation measures, January 14, 2008.
- Affidavit on behalf of the FirstEnergy Operating Companies *et al.*, before the Federal Energy Regulatory Commission in Docket No. ER01-1403 *et al.*, applying the Commission's pivotal supplier and market share screens to the FirstEnergy Operating Companies, January 14, 2008.
- Affidavit on behalf of FirstEnergy Mansfield Unit 1 Corp, before the Federal Energy Regulatory Commission in Docket No. ER08-107, assessing the appropriateness of market-based rate authority for FirstEnergy Mansfield, October 26, 2007.
- Affidavit on behalf of various affiliates of Southern Company, before the Federal Energy Regulatory Commission in Docket No. ER96-780 *et al.*, providing updated market screen analyses to support continued market-based pricing by those affiliates after Southern Companies' purchase of capacity and energy from Calpine, August 31, 2007.
- Affidavit on behalf of PacifiCorp, before the Federal Energy Regulatory Commission in Docket No. ER97-2801, providing updated delivered price test and other analyses to support continued market-based pricing by PacifiCorp after commercial operation of its new Lake Side, Marengo and Goodnoe Hills generating facilities, August 27, 2007.
- Affidavit on behalf of various affiliates of Southern Company, before the Federal Energy Regulatory Commission in Docket No. RM04-7-000, identifying and assessing the significance of various aspects of FERC's Order No. 697, its Final Rule pertaining to regulations governing market-based rate authority for wholesale sales of electricity, July 23, 2007.
- Affidavit on behalf of PacifiCorp, before the Federal Energy Regulatory Commission in Docket No. ER97-2801 *et al.*, providing updated market screen analyses to support continued market-based pricing by PacifiCorp after commercial operation of its new Lake Side, Marengo and Goodnoe Hills generating facilities, June 8, 2007.
- Affidavit on behalf of affiliates of MidAmerican Energy Holdings Company, before the Federal Energy Regulatory Commission in Docket No. ER96-719 *et al.*, concerning the extent to which MidAmerican Energy Company's operation of Council Bluffs Energy Center Unit 4, the Victory Wind Project and the Pomeroy Wind Project represents a significant change in status regarding the characteristics relied upon by the Commission in granting market-based pricing authority to affiliates of MEHC, March 2, 2007.
- Rebuttal Testimony on behalf of Southern Company Services, Inc., before the Federal Energy Regulatory Commission in Docket No. EL04-124 *et al.*, concerning various computational and conceptual issues that arise in applying the Commission's delivered price test to Southern Companies for the Southern Control Area, February 20, 2007.

- Affidavit on behalf of PSEG Energy Resources & Trade LLC *et al.*, before the Federal Energy Regulatory Commission in Docket No. ER99-3151 *et al.*, applying the Commission's pivotal supplier and wholesale market share screens to Public Service Electric and Gas Company and its affiliates, November 29, 2006.
- Affidavit on behalf of PacifiCorp and PPM Energy, Inc., before the Federal Energy Regulatory Commission in Docket No. ER97-2801 *et al.*, providing revised delivered price test analyses to support continued market-based rate authority by PacifiCorp and PPM Energy, Inc., November 6, 2006.
- Affidavit on behalf of Southern Company Services, Inc. *et al.*, before the Federal Energy Regulatory Commission in Docket No. ER96-780 *et al.*, concerning the extent to which Southern Company's acquisition of the Rowan generating station represents a significant change in status regarding the characteristics relied upon by the Commission in granting market-based pricing authority to affiliates of Southern Company, October 2, 2006.
- Affidavit on behalf of Oleander Power Project, L.P., before the Federal Energy Regulatory Commission in Docket No. ER00-3240, applying the Commission's pivotal supplier and wholesale market share screens to affiliates of Southern Company, September 27, 2006.
- Direct Testimony on behalf of Southern Company Services, Inc., before the Federal Energy Regulatory Commission in Docket No. ER04-124 *et al.*, applying the Commission's delivered price test to Southern Companies for the Southern Control Area, September 18, 2006.
- Supplemental Testimony on behalf of PacifiCorp, before the Federal Energy Regulatory Commission in Docket Nos. ER97-2801-007 and ER97-2801-010, providing updated market screen, delivered price test and other analyses to support continued market-based pricing by PacifiCorp after commercial operation of its new Currant Creek, Goshen and Leaning Juniper generators, August 21, 2006.
- Affidavit on behalf of various affiliates of D.E. Shaw, before the Federal Energy Regulatory Commission in Docket No. ER03-879 *et al.*, applying the Commission's pivotal supplier and wholesale market share screens to the D.E. Shaw affiliates, July 24, 2006.
- Affidavit on behalf of DeSoto County Generating Company, LLC, before the Federal Energy Regulatory Commission in Docket No. ER03-1383 *et al.*, demonstrating that the company's acquisition by Southern Power allows certain restrictions on its market-based rate authority to be removed, June 30, 2006.
- Affidavit on behalf of Southern Power Company, before the Federal Energy Regulatory Commission in Docket No. EC06-132-000, concerning competitive issues raised by Southern Power's proposed acquisition of Rowan County Power, LLC from Progress Energy, June 16, 2006.
- Affidavit on behalf of MidAmerican Energy Company and its affiliates, before the Federal Energy Regulatory Commission in Docket No. ER96-719 *et al.*, examining the extent to which MidAmerican's acquisition of PacifiCorp presents a departure from the conditions relied upon by the Commission in granting market-based rate authority to MidAmerican and its affiliates, April 20, 2006.

- Affidavit on behalf of Southern Power Company, before the Federal Energy Regulatory Commission in Docket No. EC06-112-000, concerning competitive issues raised by Southern Power's acquisition of the DeSoto Generating Station from Progress Energy, April 14, 2006.
- Affidavit on behalf of PPM Energy, Inc., before the Federal Energy Regulatory Commission in Docket Nos. EL05-95 and ER03-478, providing a market screen analysis to reflect the change of status as a result of the acquisition of PPM's former affiliate PacifiCorp by MidAmerican Energy Holdings Company, April 10, 2006.
- Supplemental Testimony on behalf of PacifiCorp and PPM Energy, Inc., before the Federal Energy Regulatory Commission in Docket No. ER97-2801-006 *et al.*, providing additional market screen and delivered price test analyses to assess whether PacifiCorp and PPM have market power for wholesale sales of electricity, March 29, 2006.
- Supplemental Testimony on behalf of Public Service Electric and Gas Company and Exelon Corporation, with Michael M. Schnitzer, before the State of New Jersey Board of Public Utilities in BPU Docket No. EM05020106 and OAL Docket No. PUC-1874, addressing analyses provided by PJM's Market Monitoring Unit and market power mitigation measures proposed by Joint Petitioners, March 17, 2006.
- Affidavit on behalf of PSEG Power Connecticut, LLC, before the Federal Energy Regulatory Commission in Docket No. ER99-967, applying the Commission's pivotal supplier and wholesale market share screens to PSEG Connecticut, February 28, 2006.
- Affidavit on behalf of Union Electric Company d/b/a AmerenUE and NRG Audrain Generating, LLC, before the Federal Energy Regulatory Commission in Docket No. EC06-55-000, concerning competitive issues raised by AmerenUE's proposed acquisition of the Audrain generating station from NRG, December 28, 2005.
- Affidavit on behalf of Union Electric Company d/b/a AmerenUE and affiliates of Aquila, Inc., before the Federal Energy Regulatory Commission in Docket No. EC06-56-000, concerning competitive issues raised by AmerenUE's proposed acquisition of the Goose Creek and Raccoon Creek generating stations from Aquila, December 28, 2005.
- Supplemental Rebuttal Testimony on behalf of Public Service Electric and Gas Company and Exelon Corporation, before the Board of Public Utilities of New Jersey in BPU Docket No. EM05020106 and OAL Docket No. PUC-1874-05, responding to testimony on behalf of the BPU staff concerning the horizontal competitive effects of the proposed merger of Public Service Enterprise Group and Exelon, December 12, 2005.
- Rebuttal Testimony on behalf of Public Service Electric and Gas Company and Exelon Corporation, before the Board of Public Utilities of New Jersey in BPU Docket No. EM05020106 and OAL Docket No. PUC-1874-05, responding to intervenor concerns about the competitive effects of the proposed merger of Public Service Enterprise Group and Exelon, December 5, 2005.
- Affidavit on behalf of Electric Energy, Inc., before the Federal Energy Regulatory Commission in Docket No. ER05-1482-000, applying the Commission's pivotal supplier and wholesale market share screens to the Electric Energy, Inc. control area, November 3, 2005.

- Direct Testimony on behalf of Southern Company Services, Inc., before the Federal Energy Regulatory Commission in Docket No. EL04-124, providing various delivered price test analyses to support Southern Companies' request for continuing market-based rate authority, September 20, 2005.
- Surrebuttal Testimony on behalf of the Ameren Companies, before the Illinois Commerce Commission in Docket No. 05-0160 *et al.*, responding to intervenor concerns about the underlying maturity and competitiveness of the wholesale electricity markets in which Illinois BGS auction participants can procure the wholesale supplies needed to support their auction bids, August 29, 2005.
- Additional Testimony on behalf of Public Service Electric and Gas Company, before the State of New Jersey Board of Public Utilities in BPU Docket No. EM05020106 and OAL Docket No. PUC-1874-05, that addresses the effect of the proposed merger of PSEG and Exelon on competition in the New Jersey Basic Generation Service Auction and that applies FERC's market power screen measures to the post-merger firm, August 15, 2005.
- Rebuttal Testimony on behalf of the Ameren Companies, before the Illinois Commerce Commission in Docket No. 05-0160 *et al.*, responding to intervenor arguments that there are likely to be competitive problems with Ameren's proposed competitive procurement of wholesale supplies used to provide "basic generation service," July 13, 2005.
- Direct Testimony on behalf of PacifiCorp and PPM Energy, Inc., before the Federal Energy Regulatory Commission in Docket No. ER97-2801 *et al.*, providing a delivered price test and other evidence rebutting the Commission's presumption that PacifiCorp and PPM possess market power over wholesale sales of electricity, July 8, 2005.
- Supplemental Affidavit on behalf of PacifiCorp and PPM Energy, Inc., before the Federal Energy Regulatory Commission in Docket No. ER97-2801 *et al.*, providing additional information and analyses concerning the application of the Commission's pivotal supplier and wholesale market share screens to PacifiCorp and PPM, June 8, 2005.
- Affidavit on behalf of Astoria Energy, LLC, before the Federal Energy Regulatory Commission in Docket No. ER01-3103, applying the Commission's pivotal supplier and wholesale market share screen to Astoria, May 23, 2005.
- Supplemental Testimony on behalf of various affiliates of Southern Company, before the Federal Energy Regulatory Commission in Docket No. ER97-4166-015 *et al.*, responding to issues raised by intervenors Calpine Corporation and Shell Trading Gas and Power Company concerning the "delivered price test" competitive analysis provided by Southern Company, May 16, 2005.
- Affidavit on behalf of Lake Road Generating Company, L.P., before the Federal Energy Regulatory Commission in Docket No. ER99-1714, applying the Commission's pivotal supplier and wholesale market share screens to Lake Road, May 13, 2005.
- Supplemental Testimony on behalf of Public Service Electric and Gas Company, before the State of New Jersey Board of Public Utilities in BPU Docket No. EM05020106 and OAL Docket No. PUC-1874-05, addressing revised market power mitigation proposal of merging parties PSEG and Exelon Corporation, May 12, 2005.

- Affidavit on behalf of Idaho Power Company, before the Federal Regulatory Commission in Docket No. ER97-1481-009, updating Idaho Power's market screen analysis to reflect the addition of its new Bennett Mountain generator, May 2, 2005.
- Affidavit on behalf of Southern Power Company, before the Federal Energy Regulatory Commission in Docket No. EC05-71-000, concerning competitive issues raised by Southern's proposed acquisition of the Oleander Power Project from Constellation Energy Group, April 20, 2005.
- Affidavit on behalf of UGI Development Company and UGI Energy Services, before the Federal Energy Regulatory Commission in Docket No. ER97-2817 *et al.*, applying the Commission's pivotal supplier and wholesale market share screens to UGI, April 12, 2005.
- Affidavit on behalf of La Paloma Generating Company, LLC, before the Federal Energy Regulatory Commission in Docket No. ER00-107, applying the Commission's pivotal supplier and wholesale market share screens to La Paloma and its affiliates, March 31, 2005.
- Supplemental Affidavit on behalf of the Detroit Edison Company and certain of its affiliates, before the Federal Energy Regulatory Commission in Docket No. ER93-324 *et al.*, providing additional information concerning the application of the Commission's new interim generation market power screens to Detroit Edison, March 21, 2005.
- Direct Testimony on behalf of Public Service Electric and Gas Company, before the State of New Jersey Board of Public Utilities, in BPU Docket No. EM05020106 and OAL Docket No. PUC-1874-05, assessing the competitive effects of the proposed merger of Public Service Enterprise Group Incorporated and Exelon Corporation, February 28, 2005.
- Direct Testimony on behalf of various affiliates of Southern Company, before the Federal Energy Regulatory Commission in Docket No. ER97-4166-015 *et al.*, providing a delivered price test and other evidence rebutting the Commission's presumption that Southern Company possesses market power over wholesale sales of electricity, February 15, 2005.
- Affidavit on behalf of PacifiCorp and PPM Energy, Inc., before the Federal Energy Regulatory Commission in Docket No. ER97-2801-005 *et al.*, applying the Commission's new pivotal supplier and wholesale market share screens to PacifiCorp and PPM, February 14, 2005.
- Affidavit on behalf of PSEG Lawrenceburg Energy Company LLC and PSEG Waterford Energy LLC, before the Federal Energy Regulatory Commission in Docket No. ER01-2460-002 *et al.*, applying the Commission's pivotal supplier and wholesale market share screens, February 7, 2005.
- Affidavit on behalf of the First Energy Operating Companies *et al.*, before the Federal Energy Regulatory Commission in Docket No. ER01-1403 *et al.*, applying the Commission's pivotal supplier and wholesale market share screens, February 7, 2005.
- Supplemental Affidavit on behalf of Idaho Power Company, before the Federal Regulatory Commission in Docket No. ER97-1481-003, responding to issues raised in a Commission Staff letter relating to Idaho Power's application of the Commission's pivotal supplier and wholesale market share screens, January 19, 2005.

- Affidavit on behalf of various affiliates of Ameren Corporation, before the Federal Energy Regulatory Commission in Docket No. ER-01-294-002 *et al.*, applying the Commission's new pivotal supplier and wholesale market share screens to Ameren's affiliates, December 27, 2004.
- Affidavit on behalf of Detroit Edison and various of its affiliates, before the Federal Energy Regulatory Commission in Docket No. ER02-963-002 *et al.*, applying the Commission's new pivotal supplier and wholesale market share screens to Detroit Edison Company and its affiliates, December 23, 2004.
- Affidavit on behalf of various affiliates of Black Hills Corporation, before the Federal Energy Regulatory Commission in Docket No. ER-00-1952-000 *et al.*, applying the Commission's new pivotal supplier and wholesale market share screens to Black Hills' affiliates, December 23, 2004.
- Affidavit on behalf of Minnesota Power Company, before the Federal Energy Regulatory Commission in Docket No. ER01-2636-001, applying the Commission's new pivotal supplier and wholesale market share screens to Minnesota Power and its affiliates, November 9, 2004.
- Affidavit on behalf of Oasis Power Partners, LLC, before the Federal Energy Regulatory Commission in Docket No. ER05-41-000, applying the Commission's new screens for market-based rate authority to enXco, the owner of OASIS, October 12, 2004.
- Affidavit on behalf of Idaho Power Company, before the Federal Energy Regulatory Commission in Docket No. ER97-1481-003, applying the Commission's new pivotal supplier and wholesale market share screens to Idaho Power Company, September 27, 2004.
- Affidavit on behalf of Alliant Energy Corporate Services, Inc., before the Federal Energy Regulatory Commission in Docket No. ER99-230-002, applying the Commission's new pivotal supplier and wholesale market share screens to Alliant Energy, August 20, 2004.
- Affidavit on behalf of various affiliates of Southern Company, before the Federal Energy Regulatory Commission in Docket No. ER96-2495-018 *et al.*, concerning the application of the Commission's new screens for determining the appropriateness of market-based rate authority to Southern Company, August 9, 2004.
- Affidavit on behalf of Fulton Cogeneration Associates, L.P. and Rensselaer Plant Holdco, L.L.C., before the Federal Energy Regulatory Commission in Docket No. ER04-1044-000, ER04-1045-000 and ER04-1046-000, applying FERC's new screens for determining the appropriateness of market-based rate authority, July 28, 2004.
- Rebuttal Testimony on behalf of Ameren Corporation, before the Illinois Commerce Commission in Docket No. 04-0294, concerning issues raised by Ameren's acquisition of Illinois Power Company, July 23, 2004.
- Direct Testimony on behalf of Ameren Energy Marketing Company and Central Illinois Public Service Company d/b/a AmerenCIPS, before the Federal Energy Regulatory Commission in Docket No. ER04-1001, concerning competitive issues raised by the two year extension of a power supply agreement between AEM and AmerenCIPS, July 9, 2004.
- Affidavit on behalf of Constellation Generation Group, before the New York State Public Service Commission in Case No. 04-E-0630, concerning competitive issues raised by Constellation's proposed acquisition of an interest in the Flat Rock Wind Project currently in development, May 27, 2004.

- Additional Affidavit on behalf of various affiliates of Southern Company, before the Federal Energy Regulatory Commission in Docket No. PL02-8-000 *et al.*, addressing the new market power screens and mitigation rules contained in the Commission's April 14, 2004 Order on Rehearing (107 FERC ¶ 61,018), May 14, 2004.
- Affidavit on behalf of Interstate Power and Light Company, before the Federal Energy Regulatory Commission in Docket No. EC04-61-000, concerning competitive issues raised by IPL's acquisition of an additional interest in the George Neal Generating Station Unit 4, April 26, 2004.
- Direct Testimony on behalf of Ameren Corporation and Dynegy, Inc., before the Federal Energy Regulatory Commission in Docket No. EC04-81-000, concerning competitive issues raised by Ameren's proposed acquisition of Illinois Power Company, March 25, 2004.
- Affidavit on behalf of Constellation Energy Group and Rochester Gas and Electric Corporation, before the Federal Energy Regulatory Commission in Docket No. EC04-79-000, concerning competitive issues raised by Constellation's proposed acquisition of the R.E. Ginna Nuclear Generating Station from Rochester Gas and Electric Corporation, March 23, 2004.
- Affidavit on behalf of Constellation Energy Group and Rochester Gas and Electric Corporation, before the New York State Public Service Commission in Case No. 03-E-1231, concerning competitive issues raised by Constellation's proposed acquisition of the R.E. Ginna Nuclear Generating Station from Rochester Gas and Electric, February 2, 2004.
- Rebuttal Testimony on behalf of Southern Power Company, before the Federal Energy Regulatory Commission in Docket No. ER03-713-000 *et al.*, responding to claims of intervenor witnesses that Southern Power Company's long-term power sales to its Georgia Power Company and Savannah Electric and Power Company affiliates, among other things, represent "affiliate abuse," embody cross-subsidization, are a result of improper advantages and otherwise adversely affect wholesale competition, and rejecting intervenor's proposed recommendations as anti-competitive, designed to reward inefficient competitors and likely to increase customers' costs, January 31, 2004.
- Second Affidavit on behalf of Ameren Energy, Inc. and other affiliates of Ameren Corporation, before the Federal Energy Regulatory Commission in Docket No. ER01-294 *et al.*, responding to intervenor arguments concerning the manner in which the Commission's SMA test should be applied to Ameren, January 15, 2004.
- Affidavit on behalf of various affiliates of Southern Company, before the Federal Energy Regulatory Commission in Docket No. PL02-8-000 *et al.*, addressing alternatives to the SMA and proposed market power mitigation as contained in the Commission's Staff Paper, January 6, 2004.
- Affidavit on behalf of Public Utility Subsidiaries of FirstEnergy Corp., before the Federal Energy Regulatory Commission in Docket No. ER-04-363, concerning the appropriateness of market based rate authority for the Public Utility Subsidiaries of FirstEnergy Corp., December 31, 2003.
- Affidavit on behalf of Ameren Energy, Inc. and other affiliates of Ameren Corporation, before the Federal Energy Regulatory Commission in Docket No. ER00-2687 *et al.*, concerning the appropriateness of market based rate authority for affiliates of Ameren Corporation, December 10, 2003.

- Affidavit on behalf of Idaho Power Company, before the Federal Energy Regulatory Commission in Docket No. ER97-1481-003, applying the Commission's SMA test to Idaho Power Company and its affiliates, October 9, 2003.
- Rebuttal Testimony on behalf of Ameren Energy Generating Company and Union Electric Company d/b/a AmerenUE, before the Federal Regulatory Commission in Docket No. EC03-53-000, rebutting intervenor claims that AmerenUE's purchase of generating units from its AEGC affiliate would create competitive concerns, October 6, 2003.
- Direct Testimony on behalf of Southern Power Company, before the Federal Energy Regulatory Commission in Docket No. ER03-713-000 *et al.*, concerning competitive issues raised by long-term power sales agreements between Southern Power and its Georgia Power Company and Savannah Electric and Power Company affiliates, September 22, 2003.
- Third Affidavit on behalf of Alliant Energy Services, Inc., before the Federal Energy Regulatory Commission in Docket Nos. ER99-230-002 and ER03-762-000, applying the Commission's SMA test to various control area markets, August 15, 2003.
- Affidavit on behalf of The Connecticut Light and Power Company (CL&P), before the Federal Energy Regulatory Commission in Docket Nos. EL03-123-000 and EL03-134-000, concerning incentive and public interest considerations associated with NRG Energy's attempt to discontinue standard offer service to CL&P, July 18, 2003.
- Direct Testimony on behalf of Ameren Energy Generating Company and Union Electric Company d/b/a AmerenUE, before the Federal Energy Regulatory Commission in Docket No. EC03-53-000, concerning competitive issues raised by AEGC's proposed sale of two affiliated merchant generating stations to AmerenUE, June 10, 2003.
- Affidavit on behalf of DTE East China, LLC, before the Federal Energy Regulatory Commission in Docket No. ER03-931-000, concerning the appropriateness of market based rate authority for DTE East China, an affiliate of Detroit Edison Company, June 5, 2003.
- Testimony on behalf of Detroit Edison Company, before the Michigan Public Service Commission in Case No. U-13797, addressing market power issues raised by restructuring legislation in Michigan, May 29, 2003.
- Testimony on behalf of the PJM Transmission Owners, before the Federal Energy Regulatory Commission in Docket No. ER03-738-000, concerning the appropriate equity return and depreciation lives for new transmission assets constructed by transmission owners pursuant to a regional transmission expansion plan, April 11, 2003.
- Affidavit on behalf of Baltimore Gas & Electric and various of its affiliates, before the Federal Energy Regulatory Commission in Dockets No. ER99-2948-002 *et al.*, concerning application of the Commission's SMA test to those entities, March 28, 2003.
- Affidavit on behalf of Ameren Energy Generating Company and Union Electric Company d/b/a AmerenUE, before the Federal Energy Regulatory Commission in Docket No. EC03-53-000, concerning competitive issues raised by the proposed transfer of certain generating facilities from Ameren Energy Generating Company to AmerenUE, March 13, 2003.

- Rebuttal Testimony on behalf of Public Service Electric and Gas Company, before the Federal Energy Regulatory Commission in Docket No. EL02-23-000 (Phase II), concerning financial responsibility for redispatch costs and market power issues associated with certain transmission agreements between Public Service Electric and Gas Company and Consolidated Edison Company, February 20, 2003.
- Testimony on behalf of FirstEnergy Corp and its operating company affiliates The Cleveland Electric Illuminating Company, The Toledo Edison Company, and Ohio Edison Company, before the Public Utilities Commission of Ohio in Case No. 02-1944-EL-CSS, concerning the terms and conditions under which the operating companies should purchase the accounts receivables of competitive retail electric service providers, February 19, 2003.
- Affidavit on behalf of Detroit Edison and various of its affiliates, before the Federal Energy Regulatory Commission in Docket No. ER97-324-004 *et al.*, applying the Commission's SMA test to those entities, January 31, 2003.
- Rebuttal testimony on behalf of certain "Classic" PJM Transmission Owners, before the Federal Energy Regulatory Commission in Docket No. EL-02-111-000, concerning the appropriateness of "seams" charges for transmission service between the MISO and PJM regions, December 10, 2002.
- Affidavit on behalf of various affiliates of Black Hills Corporation, before the Federal Energy Regulatory Commission in Docket No. ER00-3109 *et al.*, concerning application of the Commission's SMA test to those affiliates, November 25, 2002.
- Direct testimony on behalf of certain "Classic" PJM Transmission Owners, before the Federal Energy Regulatory Commission in Docket No. EL-02-111-000, concerning the appropriateness of "seams" charges for transmission service between the MISO and PJM regions, November 14, 2002.
- Affidavit on behalf of Southern Company Services, Inc., before the Federal Energy Regulatory Commission in Docket No. PL02-8, Conference on Supply Margin Assessment, assessing the Commission's proposed SMA market screen and accompanying market power mitigation measures, October 22, 2002.
- Second affidavit on behalf of Garnet Energy LLC, before the Federal Energy Regulatory Commission in Docket No. ER02-1190-000, responding to intervenor claims about the proper method for applying the Commission's application for market pricing authority, August 2002.
- Direct Testimony on behalf of Ameren Services Company, before the Federal Energy Regulatory Commission in Docket No. EC02-96-000, concerning competitive issues raised by Ameren's proposed acquisition of Central Illinois Lighting Company, July 19, 2002.
- Affidavit on behalf of Garnet Energy LLC, before the Federal Energy Regulatory Commission in Docket No. ER02-1119-000, concerning the application of the Commission's SMA test to Garnet, an affiliate of Idaho Power Company, July 11, 2002.
- Testimony on behalf of Public Service Electric and Gas Company, before the Federal Energy Regulatory Commission in Docket No. EL-02-23-000, concerning vertical market power issues associated with certain transmission agreements between Public Service Electric and Gas Company and Consolidated Edison Company, July 1, 2002.

- Affidavit on behalf of applicants Wisvest Corporation, Wisvest-Connecticut, LLC and PSEG Fossil LLC, before the Federal Energy Regulatory Commission in Docket Nos. EC02-87-002, ER02-2204-000 and ER99-967-002, concerning competitive issues presented by PSEG Fossil's proposed acquisition of Wisvest-Connecticut, June 28, 2002.
- Direct testimony on behalf of Ameren Corporation, before the Illinois Commerce Commission in Docket No. 02-0428, concerning competitive issues raised by Ameren's proposed acquisition of Central Illinois Lighting Company, June 19, 2002.
- Rebuttal testimony on behalf of PSEG Power in New York Public Service Commission Case No. 02-M-0132, responding to intervenor concerns about alleged horizontal and vertical market power problems arising from PSEG's construction of the Cross Hudson Project, May 2002.
- Affidavit on behalf of Southern Company Services, Inc., before the Federal Energy Regulatory Commission in Docket No. ER96-780-005, describing appropriate procedures for triennial market pricing update and addressing whether Southern Company Services, Inc. has market power in wholesale electricity markets, April 30, 2002.
- Direct testimony on behalf of PSEG Power, before New York Public Service Commission in Case No. 02-M-0132, concerning market power implications of the application of PSEG Power to construct an approximately eight mile radial connection between Bergen Generating Station in New Jersey and Consolidated Edison Company's West 49<sup>th</sup> Street Substation in New York City, April 26, 2002.
- Expert report on behalf of Virginia Electric and Power Company in Virginia Electric and Power Company v. International Paper Company, Civil Action No. 2:01cv703, United States District Court, Eastern District of Virginia, Norfolk Division, concerning damages issues associated with terminated NUG contract, March 21, 2002.
- Affidavit on behalf of Crete Energy Venture, LLC, before the Federal Energy Regulatory Commission in Docket No. ER02-963, concerning application of the Commission's SMA test to a joint venture of Entergy and DTE, February 4, 2002.
- Second Affidavit on behalf of Alliant Energy Service, Inc., before the Federal Energy Regulatory Commission in Docket No. ER99-230-002, concerning appropriate computational procedures and data sources for applying the Commission's SMA test, January 24, 2002.
- Affidavit on behalf of Rainy River Energy Corporation-Taconite Harbor, before the Federal Energy Regulatory Commission in Docket No. ER02-124-000, applying the Supply Margin Assessment test to Minnesota Power and its affiliates, January 7, 2002.
- Affidavit on behalf of Alliant Energy Services, Inc., before the Federal Energy Regulatory Commission in Docket No. ER99-230-002, applying the Supply Margin Assessment test to Alliant Energy Corporation to determine whether mitigation is required for affiliates of Alliant with market pricing authority under the procedures recently promulgated by the Commission, December 18, 2001.
- Affidavit on behalf of Southern Company Services, Inc., before the Federal Energy Regulatory Commission in Docket Nos. ER96-2495-015, ER97-4143-003, ER97-1238-010, ER98-2075-009, ER 98-542-005 and ER91-569-009, addressing the economic underpinnings of the Commission's SMA test, including its usefulness as a market power screening device, as well as the appropriateness of the mitigation measures that the Commission has ordered, December 14, 2001.

- Affidavit on behalf of Rainy River Energy Corporation – Wisconsin, before the Public Service Commission of Wisconsin in Docket No. 05-CE-128, providing a market power screen analysis to support Rainy River’s application to the Wisconsin Public Service Commission to construct, own and operate the Superior project, December 3, 2001.
- Affidavit on behalf of Attala Energy Company, LLC, before the Federal Energy Regulatory Commission in Docket No. ER02-40-000, providing a Supply Margin Assessment, consistent with proposed FERC rules, for its generation, November 5, 2001.
- Prepared Rebuttal Testimony on behalf of Appalachian Power Company d/b/a American Electric Power, before the State Corporation Commission of Virginia in SCC Case No. PUE010011, concerning AEP’s corporate separation plan, October 5, 2001.
- Affidavit on behalf of Southern Company Services, Inc., before the Federal Energy Regulatory Commission in Docket No. RM01-8-000, concerning potential competitive harms that could result if commercially sensitive transaction data are made available to the public, October 5, 2001.
- Affidavit on behalf of PSEG Lawrenceburg, before the Federal Energy Regulatory Commission in Docket No. ER01-01-2460, concerning market power issues associated with construction of new generation facilities, June 27, 2001.
- Affidavit on behalf of PSEG Waterford Energy Company, before the Federal Energy Regulatory Commission in Docket No. ER-01-2482, concerning market power issues associated with construction of new generation facilities, June 27, 2001.
- Prepared Rebuttal Testimony on behalf of Applicants FirstEnergy and Jersey Central Power & Light, before the New Jersey Board of Public Utilities in BPU Docket No. EM00110870 and OAL Docket No. PUCOT01585-01N, responding to allegations about defects in the competitive analysis of the proposed FirstEnergy-GPU merger, April 23, 2001.
- Affidavit on behalf of Nine Mile Point Nuclear Station, LLC, before the Federal Energy Regulatory Commission in Docket No. ER01-1654-000, concerning market based pricing by Nine Mile Point Nuclear Station, LLC, March 30, 2001.
- Affidavit on behalf of Niagara Mohawk Power Corporation, New York State Electric & Gas Corporation, Rochester Gas and Electric Corporation, Central Hudson Gas & Electric Corporation and Nine Mile Point Nuclear Station, LLC, before the Federal Energy Regulatory Commission in Docket No. EC01-75-000, concerning competitive issues raised by the proposed acquisition of the Nine Mile Point 1 nuclear unit and a portion of Nine Mile Point 2 nuclear unit by an affiliate of Constellation Energy Group, February 28, 2001.
- Affidavit on behalf of Constellation Energy Group *et al.*, before the Federal Energy Regulatory Commission in Docket Nos. EC01-50-000 and ER01-824-000, concerning market based pricing by affiliates of Constellation Energy Group, December 28, 2000.
- Prepared Direct Testimony on behalf of FirstEnergy and GPU, Inc., before the Federal Energy Regulatory Commission in Docket No. EC01-22-000, concerning competitive issues raised by the proposed merger of FirstEnergy and GPU, November 9, 2000.

- Prepared Direct Testimony on behalf of FirstEnergy and GPU, Inc., before the Pennsylvania Public Utility Commission in Application Docket No. A-110300F0095 *et al.*, concerning competitive issues raised by the proposed merger of FirstEnergy and GPU, November 9, 2000.
- Prepared Direct Testimony on behalf of FirstEnergy and GPU, Inc., before the Board of Public Utilities of the State of New Jersey in Docket No. EM00110870, concerning competitive issues raised by the proposed merger of FirstEnergy and GPU, November 9, 2000.
- Deposition in the matter of Illinois Power Company and Illinova Corporation v. Wegman Electric Company *et al.*, No. 98-L-280, Circuit Court of the third Circuit of Illinois, Madison County, concerning damages from having electric generating stations out of service, October 17, 2000.
- Affidavit and Declaration on behalf of Alabama Power Company, before the Environmental Protection Agency in FOIA RIN 003111-99, concerning appropriateness of protecting certain competitively valuable documents from public release, October 13, 2000.
- Affidavit on behalf of Northeast Utilities Service Company and Select Energy, Inc., before the Federal Energy Regulatory Commission in Docket No. EL00-102-000, concerning the cost of providing ICAP to New England capacity market, September 25, 2000.
- Affidavit on behalf of Ameren Energy, Inc., before the Federal Energy Regulatory Commission in Docket Nos. ER97-3664 and ER00-2687-000, concerning market based pricing of wholesale electricity by Ameren, September 22, 2000.
- Affidavit on behalf of Alabama Power Company, before the Federal Communications Commission in P.A. No. 00-003, concerning appropriateness of protecting certain competitively sensitive information from public release, September 6, 2000.
- Affidavit on behalf of Gulf Power Company, before the Federal Communications Commission in P.A. No. 00-004, concerning appropriateness of protecting certain competitively sensitive information from public release, September 6, 2000.
- Affidavit on behalf of Southern Company and Southern Energy, Inc., before the Federal Energy Regulatory Commission in Docket No. EC00-121-000, concerning whether the proposed spin-off of Southern Energy, Inc. would create competitive concerns, August 15, 2000.
- Affidavit on behalf of Northeast Utilities Service Company, before the Federal Energy Regulatory Commission in Docket Nos. EL00-62-001 and ER00-2052-002, concerning proposed termination of ICAP market and proposed mitigation of ICAP prices, May 30, 2000.
- Prepared Rebuttal Testimony on behalf of Detroit Edison Company, before the Michigan Public Service Commission in Case No. U-12134, concerning the design of a code of conduct for implementing retail customer choice, March 21, 2000.
- Affidavit on behalf of Split Rock Energy LLC, before the Federal Energy Regulatory Commission in Docket No. ER00-1857-000, concerning Split Rock LLC's application for market based pricing authority, March 10, 2000.

- Affidavit on behalf of Baltimore Gas and Electric Company, Calvert Cliffs, Inc., Constellation Enterprises, Inc. and Constellation Generation, Inc., before the Federal Energy Regulatory Commission in Docket No. EC00-57-000 and on behalf of Baltimore Gas and Electric Company, Calvert Cliffs, Inc., Constellation Generation, Inc., and Constellation Power Source, Inc., before the Federal Energy Regulatory Commission in Docket No. ER00-1598-000, concerning the application of Calvert Cliffs, Inc. and Constellation Generation, Inc. for market based pricing authority, February 11, 2000.
- Deposition in the matter of Cleveland Thermal Energy Company v. Cleveland Electric Illuminating Company, Case No. 1: 97 CV 3023, United States District Court, Northern District of Ohio, Eastern Division, concerning competitive issues and damages, October 15, December 7 and December 8, 1999.
- Supplemental Expert Report on behalf of Cleveland Electric Illuminating Company in Cleveland Thermal Energy Corp. v. Cleveland Electric Illuminating Company, Case No. 1: 97 CV 3023, United States District Court, Northern District of Ohio, Eastern Division, concerning damages issues, December 1, 1999.
- Expert Report on Behalf of Cleveland Electric Illuminating Company in Cleveland Thermal Energy Corp. v. Cleveland Electric Illuminating Company, Case No. 1: 97 CV 3023, United States District Court Northern District of Ohio, Eastern Division, concerning allegations that a clause giving Cleveland Electric Illuminating Company the right to purchase electricity at avoided costs from a cogeneration plant that Cleveland Thermal Energy Corp. would have constructed was anticompetitive and an unreasonable restraint of trade, and computing damages, September 27, 1999.
- Deposition in the matter of Florida Municipal Power Agency v. Florida Power & Light Company, Case No. 92-35-CIV-ORL22C, United States District Court, Middle District of Florida, Orlando Division, concerning damages and market issues, August 31, 1999.
- Expert Report on Behalf of Florida Power & Light Company in Florida Municipal Agency v. Florida Power & Light Company in Case No. 92-35-CIV-ORL22C, United States District Court, Middle District of Florida, Orlando Division, concerning damages and market issues, August 26, 1999.
- Affidavit on behalf of AmerGen Energy Company, before the Federal Energy Regulatory Commission in Docket Nos. EC99-104-000 and ER99-754-001, concerning AmerGen's proposed acquisition of the Clinton nuclear unit, August 1999.
- Affidavit on behalf of AmerGen Energy Company, before the Federal Energy Regulatory Commission in Docket Nos. EC99-98-000 and ER99-754-002, concerning AmerGen's proposed acquisition of the Nine Mile Point 1 nuclear unit and a portion of the Nine Mile Point 2 nuclear unit, July 1999.
- Affidavit on behalf of Minnesota Power, Inc., before the Federal Energy Regulatory Commission in Docket No. ER99-3586-000, concerning Minnesota Power's application for market based pricing authority, July 1999.
- Deposition in the matter of Allegheny Energy, Inc. v. DQE, Inc., Civ. A. No. 98-16396 (RJC), United States District Court, Western District of Pennsylvania, concerning issues relating to the value of plaintiff's generating assets, June 11, 1999.

- Affidavit on behalf of Public Service Electric and Gas Company (PSEG), before the Federal Energy Regulatory Commission in Docket No. EC99-79-000 *et al.*, concerning PSEG's request to transfer its generating assets to an affiliate, June 4, 1999.
- Expert Report on behalf of Allegheny Energy in Allegheny Energy, Inc. v. DQE, Inc. Civ. A. No. 98-16396 (RJC), United States District Court, Western District of Pennsylvania, concerning issues relating to the value of plaintiff's generating assets, May 17, 1999.
- Affidavit on behalf of Baltimore Gas & Electric (BG&E) Company, before the Federal Energy Regulatory Commission in Docket No. ER99-2948-000, concerning BG&E's application for market based pricing authority, May 13, 1999.
- Affidavit on behalf of Florida Power & Light in Florida Municipal Power Agency v. Florida Power & Light Co., Case No. 92-35-CIV-ORL-22, concerning legitimacy of Florida Power & Light's conduct, March 22, 1999.
- Affidavit on behalf of PECO Energy, before the Federal Energy Regulatory Commission in Docket No ER99-1872-000, concerning PECO's application of market based pricing authority, February 1999.
- Affidavit on behalf of Northeast Utilities, before the Federal Energy Regulatory Commission in Docket No. ER 99-1829-000, concerning Northeast Utilities application for market based pricing authority, February 1999.
- Affidavit on behalf of AmerGen Energy Company, LLC (AmerGen), before the Federal Energy Regulatory Commission in Docket Nos. EC99-11-000, EL99-13-000 and ER99-754-000, concerning (i) AmerGen's acquisition of Three Mile Island No. 1 from GPU, Inc. and (ii) AmerGen's application for market based pricing authority, November 1998.
- Affidavit on behalf of Constellation Energy Source, Inc. (CES), before the Federal Energy Regulatory Commission in Docket No. ER99-198-000, concerning CES's application for market based pricing authority, October 14, 1998.
- Affidavit on behalf of Select Energy, Inc. (Select), before the Federal Energy Regulatory Commission in Docket No. ER99-14-000, concerning Select's application for market based pricing authority, October 1, 1998.
- Rebuttal Testimony on Retail Market Power Issues on behalf of Mississippi Power Company, before the Mississippi Public Service Commission in Docket No. 96-UA-389, concerning whether Mississippi Power Company will be able to exercise market power in deregulated retail markets in Mississippi, September 11, 1998.
- Prepared Testimony and Report on Retail Market Power Issues on behalf of Mississippi Power Company, before the Mississippi Public Service Commission in Docket No. 96-UA-389, concerning whether Mississippi Power Company will be able to exercise market power in deregulated retail markets in Mississippi, August 7, 1998.
- Affidavit on behalf of Southern California Edison Company, before the Federal Energy Regulatory Commission, concerning market power issues associated with the supply of ancillary services to the California ISO, July 13, 1998.

- Prepared Rebuttal Testimony on behalf of Public Service Electric & Gas Company, with Paul Joskow, before the State of New Jersey Board of Public Utilities in Docket Nos. EX94120585Y, E097070457, E097070460, E097070463 and E097070466, responding to market power issues raised by intervenor witnesses, including in particular the role of transmission constraints in market power analyses, appropriate mitigation measures for “load pocket” situations, proper standards for granting market based pricing authority, the role of transitional mechanisms in mitigating market power concerns and the use and role of market simulations in addressing market power topics, April 13, 1998.
- Prepared Rebuttal Testimony on behalf of Atlantic City Electric Company, with Paul Joskow, before the State of New Jersey Board of Public Utilities in Docket Nos. EX94120585Y, E097070457, E094770460, E09707463 and E097070466, responding to market power issues raised by intervenor witnesses, including, in particular, the role of transmission constraints in market power analyses, appropriate mitigation measures for “load pocket” situations, proper standards for granting market based pricing authority and the use and role of market simulations in addressing market power topics, April 13, 1998.
- Prepared Additional Supplemental Direct Testimony on behalf of Ohio Edison and Centerior Energy, before the Federal Energy Regulatory Commission in Docket No. EC97-5-000, concerning the competitive analyses associated with Ohio Edison’s merger with Centerior Energy, August 8, 1997.
- Prepared Testimony on behalf of Public Service Electric and Gas Company on Market Power Issues, with Paul Joskow, before State of New Jersey Board of Public Utilities, concerning market power issues associated with PSEG’s proposal to implement retail customer choice in its competitive filings in New Jersey, July 30, 1997.
- Affidavit on behalf of Union Electric Development Corporation, before the Federal Energy Regulatory Commission in Docket No. ER97-3663-000, concerning Union Electric Development Corporation’s request for the right to make wholesale bulk power sales at market-determined prices, July 8, 1997.
- Affidavit on behalf of Union Electric Company, before the Federal Energy Regulatory Commission in Docket No. ER97-3664-000, concerning Union Electric’s request for the right to make wholesale bulk power sales at market-determined prices, July 8, 1997.
- Rebuttal Testimony on Reopening on behalf of Union Electric Company and Central Illinois Public Service Company, before the Illinois Commerce Commission in Docket No. 95-0551, addressing competitive issues raised by witnesses for intervenors and the staff of the ICC in response to previous testimony, May 23, 1997.
- Rebuttal Testimony on behalf of Wisconsin Power and Light Company, Interstate Power Company and IES Industries, Inc., before the Public Service Commission of Wisconsin in Docket No. 6680-UM-100, responding to concerns raised by intervenors regarding competitive issues associated with the proposed merger of the three companies, May 20, 1997.
- Direct Testimony on Reopening on behalf of Union Electric Company and Central Illinois Public Service Company, before the Illinois Commerce Commission in Docket No. 95-0551, responding to ICC’s request that applicants apply the screening analysis contained in Appendix A of the Federal Energy Regulatory Commission’s Order 592 to the effects of the proposed merger on existing and future Illinois retail markets, April 14, 1997.

- Prepared Rebuttal Testimony on behalf of IES Utilities, Inc., Interstate Power Company, Wisconsin Power & Light Company, South Beloit Water, Gas & Electric Company, Heartland Energy Services and Industrial Energy Applications, Inc., before the Federal Energy Regulatory Commission in Docket No. EC96-13-000, responding to issues raised by intervenors concerning the proposed merger and the application of the screening analysis contained in Appendix A of FERC's Order 592, April 14, 1997.
- Affidavit on behalf of Constellation Power Source, Inc., before the Federal Energy Regulatory Commission in Docket No. ER97-2261-000, concerning Constellation's request for the right to make wholesale bulk power sales at market-determined prices, March 25, 1997.
- Prepared Supplemental Direct Testimony on behalf of Ohio Edison Company, Pennsylvania Power Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company, before the Federal Energy Regulatory Commission in Docket No. EC97-5-000, concerning the application of the screening analysis contained in Appendix A of FERC's Order 592 to the applicants' proposed merger, March 20, 1997.
- Prepared Additional Direct Testimony on behalf of IES Utilities, Inc., Interstate Power Company, Wisconsin Power & Light Company, South Beloit Water, Gas & Electric Company, Heartland Energy Services and Industrial Energy Applications, Inc., before the Federal Energy Regulatory Commission in Docket No. EC96-13-000, concerning the application of the screening analysis contained in Appendix A of FERC's Order 592 to the applicants' proposed merger, February 27, 1997.
- Prepared Rebuttal Testimony on behalf of Union Electric Company and Central Illinois Public Service Company, before the Federal Energy Regulatory Commission in Docket No. EC96-7-000 *et al.*, addressing competitive issues related to the proposed merger of Union Electric Company and Central Illinois Public Service Company, January 13, 1997.
- Affidavit on behalf of Union Electric Company and Central Illinois Public Service Company, before the Federal Energy Regulatory Commission in Docket No. EC96-7-000 *et al.*, concerning the effect of the FERC's Policy Statement on mergers (Order No. 592) on the proposed merger of Union Electric Company and Central Illinois Public Service Company, January 13, 1997.
- Prepared Supplemental Direct Testimony on behalf of Union Electric Company and Central Illinois Public Service Company, before the Federal Energy Regulatory Commission in Docket No. EC96-7-000 *et al.*, concerning the effects of transmission constraints on the potential to exercise market power as a result of the proposed merger of Union Electric and Central Illinois Public Service Company, November 15, 1996.
- Direct Testimony on behalf of Ohio Edison Company and Centerior, before the Federal Energy Regulatory Commission in Docket No. EC97-5-000, concerning the effect of the proposed merger of Ohio Edison and Centerior on market power and competition, November 8, 1996.
- Prepared Direct Testimony on behalf of Union Electric Company, before the Missouri Public Service Commission in Case No. EM-96-149, concerning the effects on various market power concerns of the proposed merger between Union Electric Company and Central Illinois Public Service Company, November 1, 1996.

- Testimony on behalf of Virginia Electric and Power Company in the matter of Gordonsville Energy, L.P. v. Virginia Electric and Power Company, before the Circuit Court of the City of Richmond, Case No. LA-2266-4, concerning damages suffered by VEPCO as a result of a NUG outage, and the appropriateness of a liquidated damages provision in the contract between VEPCO and the NUG, October 23, 1996.
- Prepared Direct Testimony on behalf of Southern Company Services, Inc., before the Federal Energy Regulatory Commission in Docket No. ER96-780-000, concerning whether constraints on the Florida/Southern interface give Southern the ability to exercise market power, September 23, 1996.
- Deposition in the matter of Gordonsville Energy, L.P. v. Virginia Electric and Power Company, before the Circuit Court of the City of Richmond, Case No. LA-2266-4, concerning damages suffered by VEPCO as a result of a NUG outage, September 17, 1996.
- Prepared Rebuttal Testimony on behalf of Public Service Company of New Mexico, before the Federal Energy Regulatory Commission in Docket No. ER95-1800-000 *et al.*, addressing market power issues raised by intervenors in response to previous testimony, August 30, 1996.
- Prepared Testimony on behalf of Public Service Company of New Mexico, before the Federal Energy Regulatory Commission in Docket No. ER96-1551-000, concerning whether PNM possesses market power in transmission-constrained areas, July 10, 1996.
- Affidavit on behalf of Central Louisiana Electric Company, before the Federal Energy Regulatory Commission in Docket No. ER96-2677-000, concerning CLECO's request for the right to make wholesale bulk power sales at market-determined prices, July 9, 1996.
- Supplemental Direct Testimony on behalf of IES Utilities, Inc., Interstate Power Company, Wisconsin Power & Light Company, South Beloit Water, Gas & Electric Company, Heartland Energy Services and Industrial Energy Applications, Inc., before the Federal Energy Regulatory Commission in Docket No. EC96-13-000, examining the effects of the proposed formation of a regional Independent System Operator on the analyses and conclusions contained in previous testimony in support of the companies' proposed merger, June 5, 1996.
- Prepared Testimony on behalf of Minnesota Power & Light Company, before the Federal Energy Regulatory Commission in Docket No. EC95-16-000, concerning Minnesota Power & Light's request for the right to make wholesale bulk power sales at market-determined prices, May 16, 1996.
- Prepared Rebuttal Testimony on behalf of IES Industries, Inc., Interstate Power Company and WPL Holdings, Inc., before the Iowa Utilities Board in Docket No. SPU-96-6, addressing market power and competition issues raised by intervenors in response to previous merger testimony, April 22, 1996.
- Prepared Direct Testimony on behalf of IES Utilities, Inc., Interstate Power Company, Wisconsin Power & Light Company, South Beloit Water, Gas & Electric Company, Heartland Energy Services and Industrial Energy Applications, Inc., before the Federal Energy Regulatory Commission in Docket No. EC96-13-000, concerning the effects of their proposed merger on market power and competition, February 29, 1996.

- Deposition in the matter of Westmoreland-LG&E Partners v. Virginia Electric and Power Company, Case No. LX-2859-1, concerning interpretation of capacity payment provisions in power purchase agreement under which Westmoreland-LG&E sells output of non-utility generator to VEPCO, February 23, 1996 and October 9, 1998.
- Prepared Testimony on behalf of Union Electric Company and Central Illinois Public Service Company, before the Federal Energy Regulatory Commission in Docket Nos. EC96-7-000 and ER96-679-000, concerning the effects of their proposed merger on market power and competition, December 22, 1995.
- Prepared Testimony on behalf of Northeast Utilities, before the Federal Energy Regulatory Commission in Docket No. ER95-1686-000, concerning FERC's generation dominance standard in support of Northeast Utilities' request for market-based pricing authority, November 13, 1995.
- Sur-reply affidavit on behalf of Rochester Gas & Electric, before the U.S. District Court, Western District of New York, in Kamine/Besicorp Allegheny L.P. v. Rochester Gas & Electric Corporation, Case No. 95-CIV-6045L, in response to motion by Kamine/Besicorp Allegheny L.P. for a preliminary injunction, July 10, 1995.
- Prepared Supplemental Rebuttal Testimony on Transmission NOPR Issues on behalf of Florida Power & Light Company, before the Federal Energy Regulatory Commission in Docket No. ER93-465-000 *et al.*, addressing transmission NOPR issues raised by FERC Staff and Intervenors, May 19, 1995.
- Prepared Direct Testimony on Transmission NOPR Issues on behalf of Florida Power & Light, before the Federal Energy Regulatory Commission in Docket No. ER93-465-000 *et al.*, concerning the effects of FERC's recent Notice of Proposed Rulemaking on issues in FPL's ongoing case, April 25, 1995.
- Affidavit on behalf of Rochester Gas & Electric, before the U.S. District Court, Western District of New York, in Kamine/Besicorp Allegheny L.P. v. Rochester Gas & Electric Corporation, Case No. 95-CIV-6045L, in support of its opposition to a request by Kamine/Besicorp Allegheny L.P. for a temporary restraining order, March 9, 1995.
- Testimony on behalf of Virginia Power, before the Circuit Court of the City of Richmond in Case No. LW-730-4, Doswell Limited Partnership v. Virginia Electric Power Company, concerning the level of fixed gas transportation costs associated with the proxy unit which forms the basis for VEPCO's payments to Doswell, March 2, 1995.
- Prepared Rebuttal Testimony on behalf of American Electric Power Service Corporation, before the Federal Energy Regulatory Commission in Docket No. ER93-540-001, addressing issues concerning FERC's new comparability standard and its implications for AEP's transmission service offerings, January 17, 1995.
- Deposition on behalf of El Paso Electric Company and Central and South West Services, Inc., before the Federal Energy Regulatory Commission in Docket Nos. EC94-7-000 and ER94-898-000, concerning comparability and other transmission issues, December 22, 1994.
- Prepared Rebuttal Testimony on behalf of Florida Power & Light Company, before the Federal Energy Regulatory Commission in Docket No. ER93-465-000 *et al.*, concerning market power and competitive issues, comparability and other transmission issues, wholesale electric service tariff revisions, and issues concerning interchange contract revisions, December 16, 1994.

- Prepared Rebuttal Testimony on behalf of El Paso Electric Company and Central and South West Services, Inc., before the Federal Energy Regulatory Commission in Docket Nos. EC94-7-000 and ER94-898-000, concerning network transmission service and point-to-point transmission service, December 12, 1994.
- Prepared Direct Testimony on behalf of Midwest Power Systems, Inc. and Iowa-Illinois Gas and Electric Company, before the Federal Energy Regulatory Commission in Docket No. EC95-4-000, concerning competitive issues raised by their proposed merger to form MidAmerican Energy Company, November 10, 1994.
- Deposition on behalf of Florida Power Corporation in Orlando Cogen, Inc. *et al.*, v. Florida Power Corporation, Case No. 94-303-CIV-ORL-18, US District Court in and for the Middle District of Florida, Orlando Division, involving a contract dispute between FPC and one of its NUG suppliers, August 30, 1994.
- Prepared Direct Testimony on Comparability Issues on behalf of Florida Power & Light Company in Florida Power & Light Company, before the Federal Energy Regulatory Commission in Docket Nos. ER93-465-000 and ER93-922-000, concerning a discussion of the differences between types of transmission services, usage of transmission systems by their owners, transmission services that FPL provides, and how those services compare and contrast with FPL's own uses of the transmission system, August 5, 1994.
- Prepared Answering Testimony on behalf of Florida Power & Light Company, before the Federal Energy Regulatory Commission in Docket Nos. ER93-465-000 and ER93-922-000, concerning (i) whether municipal systems should receive billing credits for certain transmission facilities which they own which were argued to be part of an "integrated" transmission grid, and (ii) FPL's obligation to sell wholesale power under its Nuclear Regulatory Commission antitrust license conditions, July 7, 1994.
- Deposition on behalf of Virginia Electric & Power Co. in re: Doswell Limited Partnership v. Virginia Electric & Power Co., Case No. LW-730-4, Circuit Court for the City of Richmond, involving an alleged fraud and breach of contract relating to payments by VEPCO to one of its NUG suppliers, April 5, 1994.
- Prepared Final Rebuttal Testimony on behalf of Central Louisiana Electric Company, before the Federal Energy Regulatory Commission in Docket No. ER93-498-000, examining an allegation of predatory pricing, March 16, 1994.
- Prepared Rebuttal Testimony on behalf of Central Louisiana Electric Company, before the Federal Energy Regulatory Commission in Docket No. ER93-498-000, examining an allegation of a municipal joint action agency that Central Louisiana's contract to provide bulk power service to a new municipal system customer constituted predatory pricing, December 23, 1993.
- "Comments on the Commerce Commission's Draft Determination Concerning Trans Power's Proposal to Recover Fixed/Sunk Transmission Costs," testimony on competitive issues prepared at the request of The Electricity Industry Committee, New Zealand, November 30, 1993.
- Prepared Direct Testimony on behalf of Florida Power & Light Company, before the Federal Energy Regulatory Commission in Docket Nos. ER93-465-000 and ER93-922-000, concerning competitive implications of wholesale tariff revisions, interchange contract revisions and a proposed "open access" transmission tariff, November 26, 1993.

- Deposition on Behalf of Florida Power & Light in Florida Municipal Power Agency v. Florida Power & Light Co., Case No. 92-35-CIV-ORL-22, concerning damage related issues, July 21 and 22, 1993.
- Affidavit on behalf of Florida Power & Light in Florida Municipal Power Agency v. Florida Power & Light Co., Case No. 92-35-CIV-ORL-22, concerning damage related issues, July 14, 1993.
- Prepared Direct Testimony on behalf of the Detroit Edison Company In the Matter of the Application of the Association of Businesses Advocating Tariff Equity for Approval of an experimental retail wheeling tariff for Consumers Power Company, Case No. U-10143, and In the Matter on the Commission's own motion, to consider approval of an experimental retail wheeling tariff for The Detroit Edison Company, Case No. U-10176, before the Michigan Public Service Commission, March 1, 1993.
- Deposition on behalf of Florida Power & Light in Florida Municipal Power Agency vs. Florida Power & Light Company, Case No. 92-35-CIV-ORL-22, concerning relevant markets, market power and competitive issues, February 25, 1993.
- Deposition in Tucson Electric Power Company v. SCE Corporation *et al.*, Superior Court of the State California, Case No. 628170, June 19, 1992.
- Affidavit on behalf of Iowa Power Inc. and Iowa Public Service Company, before the Federal Energy Regulatory Commission, concerning the competitive effects of a merger of the two companies, 1991.
- Testimony on behalf of Defendants Union Electric and Missouri Utilities, in City of Malden, Missouri v. Union Electric Company and Missouri Utilities Company, U.S. District Court, Eastern District of Missouri, Southeastern Division, Civil Action No. 83-2533-C, 1988.
- Testimony on behalf of Defendant Union Electric, in City of Kirkwood, Missouri v. Union Electric Company, U.S. District Court, Eastern District of Missouri, Civil Action No. 86-1787-C-6 (deposition testimony), 1987.
- Testimony on behalf of Defendant Union Electric Company, in Citizens Electric Corporation v. Union Electric Company, U.S. District Court, Eastern District of Missouri, Eastern Division, Civil Action No. 83-2756C(c), 1986.
- Testimony on behalf of Advo-System, Inc., before the Postal Rate Commission, Docket No. R84-1, concerning rates for third class mail, 1984.
- Testimony on behalf of D/FW Signal, Inc., before the Federal Communications Commission, Docket No. CC83-945, concerning cellular telephone service in Dallas-Fort Worth, 1983.
- Testimony on behalf of the Department of Defense, before the Montana Public Service Commission, Docket No. 82.2.8, concerning telephone service rate structure, 1982.
- Testimony on behalf of Multnomah County, before the Public Utility Commissioner of Oregon, Docket UF 3565, concerning telephone service rate structure, 1980.

- Testimony on behalf of the Louisiana Consumer League, before the Louisiana Public Service Commission, Docket No. U-14078, concerning marginal cost pricing for Louisiana Power and Light Company, 1979.
- Testimony on behalf of the State of Oregon, City of Portland, and County of Multnomah, before the Public Utility Commissioner of Oregon, Dockets UF3342 and UF3343, concerning rates for Centrex and ESSX telephone service, 1978.

## **SELECTED REPORTS AND PAPERS**

- “Comments” in Federal Energy Regulatory Commission Docket No. RM04-7-000, concerning rules governing short-term transactions between generation-owning regulated electric utilities and their marketing affiliates, June 30, 2004.
- “Large RTOs and Traditional Transmission Pricing Don’t Mix,” with Michael Quinn, prepared for The Electricity Journal, January/February 2002.
- “Potential Adverse Consequences of Poor Transmission Pricing,” prepared for Southern Company Services, Inc., October 23, 2001.
- “An Economic Assessment of the Benefits of Repealing PUHCA,” with John Landon, Ajay Gupta and Virginia Perry-Failor, prepared for Mid-American Energy Holdings, April 2000.
- Updated Market Power Analysis for Detroit Edison Company, concerning Detroit Edison Company’s market based pricing authority, submitted to the Federal Energy Regulatory Commission, December 17, 1999.
- Report of Ameren to the Public Service Commission of Missouri on Market Power Issues, concerning whether Ameren, created by the merger of Union Electric Company and Central Illinois Public Service Company, is likely to have market power if deregulation and retail competition are introduced in Missouri, February 27, 1998.
- “Supporting Companies’ Report on Horizontal Market Power Analysis,” with Paul Joskow, concerning analysis of market power issues in connection with a proposed reorganization of the PJM Pool, July 14, 1997.
- “International Electricity Sector Investment by US Electric Utilities,” with Graham Hadley, Paul Hennemeyer and Barbara MacMullen, prepared for The Kansai Electric Power Company, Inc., March 5, 1997.
- “Report on Horizontal Market Power Issues,” with Paul Joskow, prepared for Southern California Edison Company in FERC Docket No. ER96-1663-000, May 29, 1996.
- “Recent Developments in North American Electric Generation Capacity Procurement Systems,” with Mahim Chellappa, prepared for Electricite de France (EDF), Paris, France, August 1994.
- “Comments on Transmission Reform Proposals,” report prepared for the Edison Electric Institute, October 1993.
- “Sunk Transmission Cost Recovery Issues,” report prepared for The Electricity Industry Committee, New Zealand, September 1, 1993.

- “Opportunity Cost Pricing for Electric Transmission: An Economic Assessment,” report prepared for Edison Electric Institute, June 1992.
- “Transmission Access and Pricing: What Does A Good ‘Open Access’ System Look Like,” NERA Working Paper #14, January 1992.
- “Evaluation of Qualifying Facility Proposals,” prepared for Florida Power Corporation, March 1991.
- “Design of Capacity Procurement Systems,” prepared for Electricite de France, January 1991.
- “Issues in the Design of Generating Capacity Procurement Systems,” prepared for TransAlta Utilities, January 1991.
- “Government Regulators and Market Power Issues,” prepared for Edison Electric Institute, January 1991.
- “A Critique and Evaluation of the Large Public Power Council’s Transmission Access and Pricing Proposal,” prepared for Edison Electric Institute, December 1990.
- “The Effects of a Premature Shutdown of the Trojan Nuclear Power Plant,” prepared for Portland General Electric Company, October 1990.
- “An Examination of the Proper Role for Utilities in Promoting Conservation Expenditures,” prepared for Public Service Electric and Gas Company with T. Scott Newlon, 1990.
- “Issues Concerning Selection Criteria Development for Capacity RFPs,” prepared for the Bonneville Power Administration, February 15, 1990.
- “Nonutility Generators and Bonneville Power Administration Resource Acquisition Policy,” prepared for the Bonneville Power Administration, with David L. Weitzel, January 31, 1990.
- “An Evaluation of Resource Solicitation Alternatives,” prepared for the Bonneville Power Administration, January 31, 1990.
- “Approaching the Transmission Access Debate Rationally,” Transmission Research Group Working Paper Number 1, with Joe D. Pace, November 1987.
- “The Essential Facilities Doctrine,” NERA, June 1985.
- “The Nuclear Regulatory Commission’s Antitrust Review Process: An Analysis of the Impacts,” Transcomm, Inc., prepared for the U.S. Department of Energy, 1981.
- “Competitive Aspects of Utility Involvement in Cogeneration and Solar Programs,” Transcomm, Inc., prepared for the U.S. Department of Energy, June 1981.
- “An Appraisal of Antitrust Review Extension in the Context of Small Utility Fuel Use Act Compliance,” Transcomm, Inc., prepared for the U.S. Department of Energy, July 28, 1980.
- “Analysis of Proposed License Conditions with Respect to Antitrust Deficiencies,” Transcomm, Inc., prepared for the U.S. Nuclear Regulatory Commission, 1978.

- “Analysis of NRC Staff’s Proposed License Conditions for Midland Units,” Transcomm, Inc., prepared for the U.S. Nuclear Regulatory Commission, August 7, 1978.

## SELECTED SPEECHES

- “Coping With Uncertainty in Power Supply Planning,” presented to the National Rural Utilities Cooperative Finance Corporation’s Independent Borrowers Executive Summit, San Diego CA, with John Landon, November 17, 2010.
- “Key Issues that Keep IOU Executives Awake at Night,” presented to the National Rural Utilities Cooperative Finance Corporation’s Independent Borrowers Executive Summit, San Diego CA, with John Landon, November 16, 2010.
- Panelist at Edison Electric Institute’s Supply Policy Task Force conference discussing various topics associated with proposed revisions to FERC’s procedures for determining when market-based as opposed to cost-based pricing is appropriate, Washington, DC, July 18, 2006.
- “Resource Acquisition and Market Power Topics: Overview of FERC’s Current and Evolving Practices,” presented to Edison Electric Institute Workshop on Market Power Policies and Current Practices at the NARUC’s Summer Committee Meetings, Salt Lake City, Utah, July 10, 2004.
- “Examining the Commission’s Recent Treatment of Market Power and Competitive Issues,” speech presented to the Edison Electric Institute Spring Legal Conference, Scottsdale, Arizona, March 29, 2004.
- Presentation on Transmission Pricing Issues to the EEI Winter Chief Executive Conference and Board of Directors Meeting, Scottsdale, AZ, January 10, 2002.
- Presentation to the Board of Directors of the Salt River Project on Code of Conduct Issues Associated with Industry Restructuring, November 9, 1998.
- “FERC’s Approach To Addressing Horizontal Market Power in Electric Mergers,” speech presented to Infocast Conference on Utility Mergers & Acquisitions, Washington, D.C., July 17, 1998.
- “Problems in Applying the Appendix A Analytical Screen,” speech presented to the Edison Electric Institute Workshop on Practical Applications of the FERC Merger Policy Guidelines, Arlington, Virginia, April 1, 1997.
- “Evolving Market Power Issues in the Context of Electric Restructuring,” speech presented to Eastern Mineral Law Foundation Forum on Natural Resources and Energy Law, Sanibel Island, Florida, February 13, 1997.
- “An Overview of Antitrust in the Electric Industry,” speech presented to Antitrust Law & Economics for the Electric Industry, sponsored by Energy Business, Inc., Washington, D.C., February 22, 1996.
- “Moving From Here to There: Some Implications for Electric Transmission,” speech presented to the Infocast Power Industry Forum, Palm Springs, California, February 17, 1995.

- “What Does ‘Comparability’ Really Mean?,” speech presented to The Federal Energy Bar Association, Washington, D.C., November 17, 1994.
- “Current Transmission Topics” and “Trans Alta’s Unbundled Rate Proposal,” presented to the Canadian Electrical Association, Montreal, PQ, Canada, May 9, 1994.
- “Retail Wheeling Issues,” speech presented to the Edison Electric Institute National Accounts Workshop, Atlanta, Georgia, February 7, 1994.
- “Retail Wheeling: Doing It the Right Way,” speech presented to the Retail Wheeling Conference, Denver, Colorado, November 8, 1993.
- “Retail Wheeling,” speech presented to the Missouri Valley Electric Association Division Conference, Kansas City, Missouri, October 22, 1993.
- “An Economic Perspective on Current Transmission Pricing Issues,” speech presented to the Edison Electric Institute 1993 Fall Legal Committee Meeting, Minneapolis, Minnesota, October 7, 1993.
- “Characteristics of a ‘Good’ Retail Wheeling System,” speech presented to the Second Annual Electricity Conference sponsored by Executive Enterprises, Inc., Washington, D.C., April 21-22, 1993.
- “Characteristics of a ‘Good’ Retail Wheeling System,” speech presented to the Electric Utility Business Environment Conference sponsored by Electric Utility Consultants, Inc., Denver, Colorado, March 16-17, 1993.
- “Change in the Industry,” seminar presentation on privatization and service unbundling presented to Ontario Hydro management and special strategy task force, Ontario, Canada, February 3, 1993.
- “The U.S. Experience and What Is To Come,” speech presented to NERA Seminar on Competition in the Regulated Industries (Electric/Telecommunications), Rye Town Hilton, Rye Town, New York, October 30, 1992.
- “Emerging Transmission Pricing Issues,” speech presented to Electric Utility Consultants, Inc.’s 3rd Annual Transmission & Wheeling Conference, Chicago, Illinois, September 22-23, 1992.
- “Emerging Transmission Pricing Issues,” speech presented to Executive Enterprises, Inc., 1992 Electricity Conference: Restructuring the Electricity Industry, Washington, D.C., September 15-16, 1992.
- “A Pragmatic Look at Open Access,” presented to DOE/NARUC Workshop on Electricity Transmission, Stockbridge, Massachusetts, June 2, 1992.
- “Some Thoughts About Open Access,” presented to EMA’s Issues and Outlook Forum, Atlanta, Georgia, May 5, 1992.
- “Transmission Access: How Should We Proceed?” speech presented to the Second Annual Transmission and Wheeling Conference, Denver, Colorado, November 21, 1991.
- “Can We Implement Reasonable Transmission Pricing and Access Procedures?” presented to the Edison Electric Institute System Planning Committee, Dallas, Texas, October 24, 1990.

- “Issues in the Design of Competitive Bidding Systems,” presented at the Pennsylvania Electric Association System Planning Meeting,” 1990.
- “Should We Use Opportunity Cost Pricing for Transmission?” presented to the Edison Electric Institute Interconnection Arrangements Committee, 1990.
- “Recent Changes in the Electric Power Industry and Pressures on the Transmission System,” presented at seminar “Competitive Electricity: Why the Debate?” Sponsored by the Electricity Consumers Resource Council, 1988.
- “Some Thoughts on New Transmission Access and Pricing Proposals,” presented at “Transmission Pricing and Access: Reinventing the Wheel” conference, sponsored by Cogeneration and Independent Power Coalition of America and American Cogeneration Association, 1988.

## PROMOD Modeling and Data

This exhibit provides a summary of the PROMOD IV (“PROMOD”) model, data and assumptions used in analyzing the Illinois Rivers Project, and the methodology for estimating the effect of the project on wholesale electric energy prices and supply to the MISO Illinois region.

### The PROMOD Model

PROMOD is an electric market simulation model marketed by Ventyx. PROMOD provides a geographically and electrically detailed representation of the topology of the electric power system, including generation resources, transmission resources, and load. This detailed representation allows the model to capture the effect of transmission constraints on the ability to flow power from generators to load, and thus calculates Locational Marginal Prices (“LMPs”) at individual nodes within the system. PROMOD and similar dispatch modeling programs are used to forecast electricity prices, understand transmission flows and constraints, and predict generation output. It can also perform and support various reliability analyses, including calculation of loss-of-load probability, expected unserved energy, and effective capacity support.

### Data and Assumptions

The analysis of the Illinois Rivers Project relies on data developed by the Midwest ISO (“MISO”) in its Multi Value Project (“MVP”) process. A detailed description of MISO’s MVP process and data analysis is provided in the MVP Report.<sup>1</sup> The principal purpose of the MVP projects are, as described by MISO, “to meet one or more of three goals: reliably and economically enable regional public policy needs; provide multiple types of economic value; and provide a combination of regional reliability and economic value.”<sup>2</sup> To identify these transmission projects, MISO has performed detailed economic and engineering analyses of many alternative transmission projects and portfolios using PROMOD. The analyses herein are based on the same data sets and analyses developed by MISO to perform its analysis.

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<sup>1</sup> MISO, *Multi Value Project Portfolio: Results and Analyses*, January 10, 2012 (hereafter “MVP Report”).

<sup>2</sup> MISO website, available at <https://www.midwestiso.org/Planning/Pages/MVPAnalysis.aspx>, accessed November 6, 2012.

The data and assumptions used by MISO in its MVP analysis are based on Ventyx-provided data, and have been modified as needed by MISO. This data includes:

1. load forecasts provided by individual utilities within MISO,<sup>3</sup>
2. transmission line data from transmission operators,<sup>4</sup>
3. unit specifications for existing generation resources,<sup>5</sup>
4. new generation resources based on units planned and under construction,<sup>6</sup>
5. future generation resource additions developed by a capacity expansion model,<sup>7</sup>
6. retirement of generation facilities based on currently announced retirements, but not in response to economic or regulatory factors, including EPA regulation,<sup>8</sup>
7. “hurdle rates” for transactions between NERC regions,<sup>9</sup> and
8. fuel and emission price forecasts.

The system modeled includes individual generator data and complete transmission information for the Eastern Interconnection,<sup>10</sup> at the bus<sup>11</sup> level.

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<sup>3</sup> Demand and energy growth rates for each region are provided in: MISO, *MISO Transmission Expansion Plan 2011: PROMOD Case Assumptions Document*, p 23 (“MTEP PROMOD Assumptions” hereafter).

<sup>4</sup> Transmission constraints are based on the most recent Book of Flowgates from MISO and North American Electric Reliability Corporation (NERC), updated to include rating and configuration changes from studies performed during the MTEP 11 process. Transmission line data includes items such as the voltage rating of the line and the buses that each line runs between.

<sup>5</sup> Individual unit specifications include maximum operating capacity; fuel type; variable costs; no-load and startup costs; minimum run times; emission rates; and heat rate curves.

<sup>6</sup> Detailed information on the existing, under construction and planned units in each region is provided in MTEP PROMOD Assumptions, p 17.

<sup>7</sup> MISO relies upon the Electric Generation Expansion Analysis System (EGEAS) model developed by the Electric Power Research Institute. EGEAS is designed to find the optimized capacity expansion plan to meet forecast demand (load plus planning reserve margin target minus losses) through a least cost-mix of supply-side and demand-side resources. Planning reserve margins are identified in MTEP PROMOD Assumptions, pp 23-24.

<sup>8</sup> As part of MTEP 2011, MISO has performed an EPA Regulation Impact Analysis that identifies planning needs arising from the retirement of coal-fired generation facilities due to EPA regulations and other market factors (*e.g.*, competition from natural gas-fired generation). MISO’s MVP analysis does not incorporate any retirements of coal-fired generation, aside from already announced retirements.

<sup>9</sup> PROMOD allows power to flow between regions based on economic transactions (subject to security constraints and congestion) such that prices must exceed generator costs in a neighboring region by a dollar per MWh “hurdle rate” in order for power to flow across regions.

<sup>10</sup> The Eastern Interconnection comprises roughly the eastern two-thirds of the “lower 48” (excluding portions of Texas), including the Canadian provinces east of Alberta and the following NERC regions: Midwest Reliability Organization (MRO), Southwest Power Pool (SPP), SERC Reliability Corporation (SERC), Florida Reliability Coordinating Council (FRCC), ReliabilityFirst Corporation (RFC), and Northeast Power Coordinating Council (NPCC). MISO’s PROMOD modeling excludes Peninsular Florida, New England, and Eastern Canada, but

The quantity and location of future renewable resources, including wind and solar, are determined by MISO both to meet state RPS requirements and reduce the combined cost of renewable and transmission resources.<sup>12</sup> Based on these requirements, MISO’s analysis assumes that 8,765 MW of new wind resources are added in 2021, and an additional 2,272 MW of new wind resources are added by 2026.<sup>13</sup>

The Illinois Rivers Project includes four projects within the MVP portfolio.<sup>14</sup> These projects are listed in Table 1, and are shown geographically in Figure 1. The analysis herein compares scenarios with and without the Illinois Rivers Project transmission elements. Both scenarios include all of MISO’s other (*i.e.*, non-Illinois Rivers Project) MVP projects.<sup>15</sup> Apart from the presence of the Illinois Rivers Project itself, the only other difference between the “with Illinois Rivers Project” and “without Illinois Rivers Project” cases is the capacity of wind resources in service. In the “without Illinois Rivers Project” case, the quantity of new wind resources has been reduced because the transmission system cannot support all new MVP wind resources without introducing reliability risks. Unless new wind additions are reduced, power flows may exceed line capacities under certain contingencies. To determine the quantity of wind capacity that can be supported, MISO performs an analysis that identifies the minimum quantity of wind capacity curtailments that allow line loading to be kept within limits.<sup>16</sup> Table 2 reports the difference in new wind power capacity between the “with Illinois Rivers Project” and “without Illinois Rivers Project” cases based on analysis by MISO.<sup>17</sup>

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accounts for aggregate regional flows to and from these areas through the use of fixed transactions. For more detail, see MTEP PROMOD Assumptions, p 24.

<sup>11</sup> A bus is the specific geographical point that a generator is located at or that a transmission line connects to.

<sup>12</sup> MISO determined the amount of wind enabled by the MVP portfolio by first determining the amount of wind needed to meet RPS targets, and then determining what amount of wind would not be supported but for the MVP portfolio. This process is detailed by MISO in the MVP Report, pp 17-20 and 48-49.

<sup>13</sup> Table 4.2, MVP Report. MISO also finds that the MVP portfolio can support an additional 2,230 MW of additional wind power from the wind zones without incurring additional reliability constraints. MVP Report, pp 48-49.

<sup>14</sup> These four are: (1) Palmyra Tap–Quincy–Meredosia–Ipava & Meredosia–Pawnee; (2) Pawnee–Pana; (3) Pana–Mt. Zion–Kansas–Sugar Creek; and (4) Sidney–Rising.

<sup>15</sup> These “other” MVPs are identified in Table 1.1 of the MVP Report.

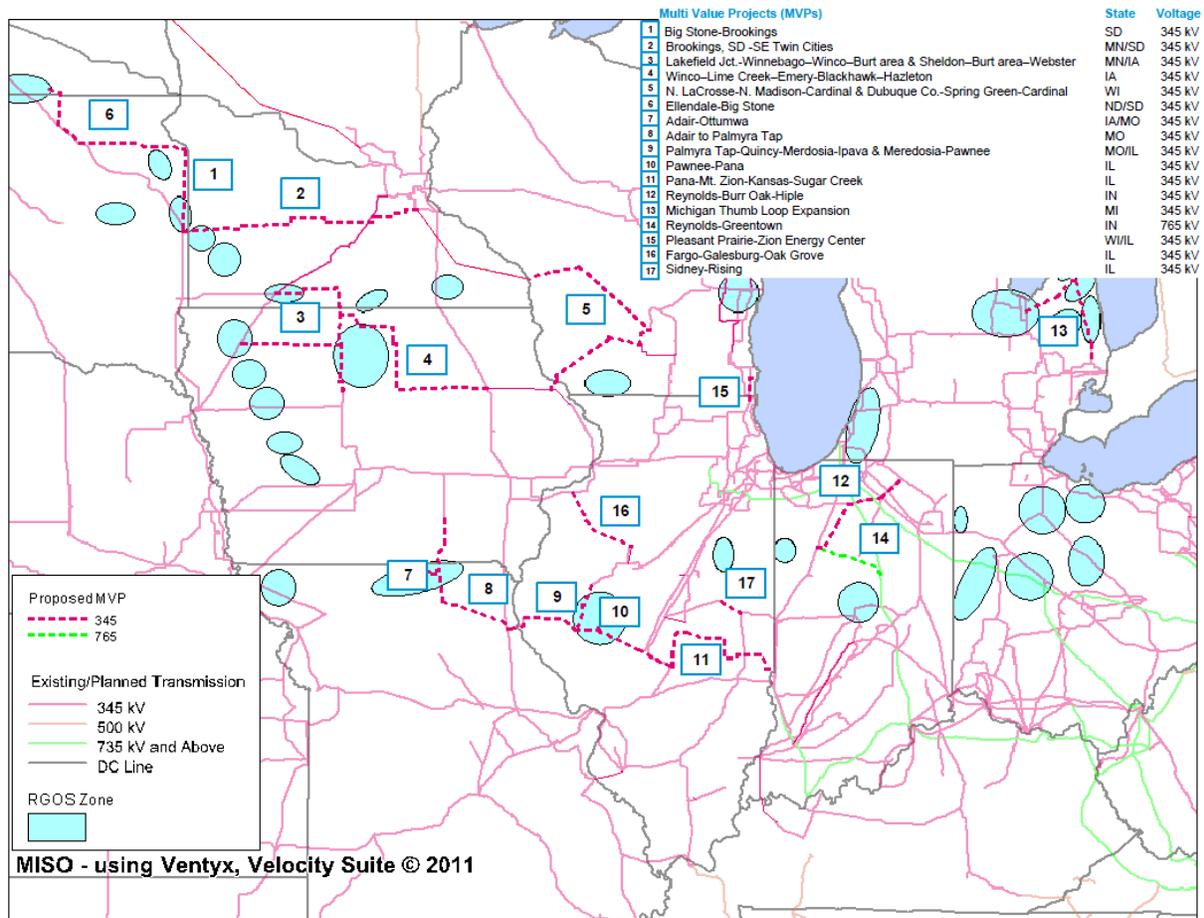
<sup>16</sup> For further detail on this analysis, see MVP Report at p 48.

<sup>17</sup> Direct communication with MISO, October 18, 2012. The wind zones identified in Table 1 refer to wind zones defined by MISO through its wind siting strategy. For more detail, see MVP Report at pp 17-18.

**Table 1**  
**Illinois Rivers Project Elements**

MVP Element	Project	Voltage	In-Service Year
9	Palmyra Tap–Quincy–Meredosia–Ipava & Meredosia–Pawnee	345	2016/17
10	Pawnee–Pana	345	2018
11	Pana–Mt. Zion–Kansas–Sugar Creek	345	2018/19
17	Sidney–Rising	345	2016

**Figure 1**  
**Map of MVP Portfolio**



**Table 2**  
**Reduction in New Wind Capacity in the “Without Illinois Rivers Project” Case**

Wind Zone	MW Reduction
Illinois (Zone F)	112
Illinois (Zone K)	402
Missouri (Zone C)	450
Wisconsin (Zone B)	211
White Oak	43
Total	1,218

Note: Zones refer to wind zones within each state, identified as a part of MISO’s MVP process.

### **Analytical Method**

Two computations were performed, (i) a wholesale electric energy price comparison that evaluates the changes in LMPs and accompanying customer payments as a result of the Illinois Rivers Project, and (ii) a Delivered Price Test (“DPT”), which determines changes in Economic Capacity<sup>18</sup> available to serve the MISO Illinois region as a result of the Illinois Rivers Project, both from within the MISO Illinois region and via imports. The analytical method used for these two computations is described further below.

### ***Wholesale Electric Energy Price and Payment Comparison***

Computation of wholesale electric energy price and payments is based on two outputs from the PROMOD model: area LMPs and area load. The process used to develop changes in wholesale energy prices and payments is as follows:

1. Area LMPs are calculated by PROMOD and reflect the load-weighted LMP of all nodes within the area. Results are first presented which show the LMP differences across the MISO Illinois region<sup>19</sup> between the “with Illinois Rivers Project” and “without Illinois Rivers Project”.

<sup>18</sup> Economic Capacity is a term used by the Federal Energy Regulatory Commission in competitive analyses to refer to generation capacity that is located within, or can be delivered into, a market area at a delivered cost that is no greater than 1.05 times the competitive price in the market.

<sup>19</sup> The MISO Illinois region is comprised of Ameren Illinois, the Springfield, Illinois City Water Light & Power (CWLP) system and Southern Illinois Power Company.

2. Area load is based on the PROMOD inputs used by MISO, and reflects hour-by-hour load forecasts for individual areas within MISO.<sup>20</sup> The hourly area load is multiplied by the hourly LMP to calculate the hourly cost of wholesale electric energy for each area. The cost of wholesale electric energy for 2021 and 2026 is calculated by summing hourly costs across all 8,760 hours in the year and across the three areas in MISO Illinois.
3. An adjustment to the hourly wholesale energy payments is made for CWLP and SIPC. Because CWLP is a municipal utility and SIPC is an electric cooperative, any changes in profits (revenues minus costs) to generation facilities owned by CWLP and SIPC can be used to reduce the rates charged to CWLP and SIPC customers. Consequently, in each scenario, the profits earned by CWLP and SIPC's generators are subtracted from the LMP-based payments for wholesale energy to arrive at a net payment.
4. Using these cost estimates for 2021 and 2026, changes in net payments are estimated for a 20-year period starting in 2020. The year 2020 is chosen to start the flow of changes in wholesale electric energy payments, because this is the first full year in which all elements of the Illinois Rivers Project are in service.<sup>21</sup> Twenty years of payment reductions are calculated, consistent with the shorter of the two evaluation periods used in MISO's MVP economic analysis.<sup>22</sup> Payment changes over the period 2020 to 2039 are calculated through interpolation and extrapolation from the 2021 and 2026 results. Annual results are then discounted back to 2013 using both a 3.0 percent and 8.2 percent discount rate to account for a range of possible opportunity costs.<sup>23</sup>
5. The net change in payments from the Illinois Rivers Project also reflects presumed transmission payments by MISO Illinois customers to support the cost of the Illinois Rivers Project. These costs reflect two components. The first is capital costs for new

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<sup>20</sup> These loads reflect forecasts for annual peak load and annual energy shaped over 8,760 hours.

<sup>21</sup> Estimated in-service data for the four elements of the Illinois Rivers Project are: (1) 2016/2017 for Palmyra Tap–Quincy–Meredosia–Ipava & Meredosia–Pawnee; (2) 2018 for Pawnee–Pana; (3) 2018/2019 for Pana–Mt. Zion–Kansas–Sugar Creek; and (4) 2016 for Sidney–Rising. *See* Table 1.1 of the MVP Report.

<sup>22</sup> MISO evaluates the MVP projects over 20- and 40-year horizons. *See* MVP Report at p 68.

<sup>23</sup> These discount rates are consistent with those used by MISO in its economic analysis. *See* MVP Report at p 68.

transmission plant. Consumers are assumed to begin paying for each element of the Illinois Rivers Project at the individual element's in-service data. These costs of the project are based on Ameren estimates as detailed in the testimony of other ATXI witnesses. The second component is annual expenses. This cost is based on Ameren Illinois Company's October 2012 Attachment O rate formula filing.<sup>24</sup> The portion of O&M and Taxes (other than income taxes) allocated to transmission in the formula rate is divided by transmission gross plant in service to calculate an annual transmission expense factor.<sup>25</sup> This factor is then applied to the Illinois Rivers Project capital cost to estimate ongoing annual expenses. The cost of the 2012 capital cost elements is inflated to 2013. All future costs are discounted back to 2013. Two sets of inflation/discount rates are used: 1.74 percent inflation with a 3 percent discount rate, and 2.91 percent inflation with an 8.2 percent discount rate. As with all MVPs, transmission costs are then allocated to MISO customers based on their share of MWh load.<sup>26</sup> In the computations herein, MISO Illinois customers are assigned 9.5 percent of the total cost of the Illinois Rivers Project.<sup>27</sup> Transmission payments for MISO Illinois customers total \$138 million on a present value basis using a 3 percent discount rate and \$110 million using an 8.2 percent discount rate.

These net benefits are conservative, because they reflect only reduced wholesale electric energy payments and not also other possible payment reductions such as those relating to capacity cost, operating reserves, planning reserve margins, and transmission line losses.<sup>28</sup> The estimate also does not account for other benefits to customers, such as improved reliability and the increased ability to meet RPS requirements.

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<sup>24</sup> Ameren Illinois Company, Attachment O to MISO Tariff filing, October 2012. Available at <https://www.midwestiso.org/Library/Pages/ManagedFileSet.aspx?SetId=259>, accessed November 5, 2012.

<sup>25</sup> Transmission O&M charges are adjusted to exclude LSE Expenses and Account 565 expenses as detailed in Ameren Illinois Company's Attachment O.

<sup>26</sup> MISO Tariff, Attachment MM, Multi-Value Project Charge.

<sup>27</sup> 9.5 percent is calculated as the MISO Illinois share of total MISO load based on the 2021 Business as Usual: Low Demand scenario.

<sup>28</sup> MVP Report, pp 50-65.

### *Delivered Price Test*

There are two components measured by the DPT for the MISO Illinois region: (1) Economic Capacity within the MISO Illinois region and (2) Economic Capacity from outside the MISO Illinois region that can be imported into it.

#### *Economic Capacity within MISO Illinois*

The first step is to develop Reference Prices for each scenario based on the results from the PROMOD runs. Reference Prices are developed for each of the following three periods.

- a. *Summer Extreme Peak.* 1 percent highest load summer on-peak hours, where summer on-peak hours include June to August, M-F, 6am to 10pm CT, excluding NERC holidays.
- b. *Summer Peak.* Summer on-peak hours, excluding Summer Extreme Peak hours. Summer on-peak hours include June to August, M-F, 6am to 10pm CT, excluding NERC holidays.
- c. *Off-peak.* Off-peak hours, where off-peak hours include 24 hours on Saturday, Sunday and NERC holidays, and 8 hours (10pm to 6am CT) M-F (excluding NERC holidays).

The second step is to determine the Economic Capacity within the region, which is the capacity (MW) of generator units located in MISO Illinois that have a production cost less than or equal to 1.05 times the Reference Price as defined above. Production costs reflect each unit's average production cost at full capacity. Available capacity is calculated as the unit's full capacity less an average forced outage rate (applied during all seasons) and planned outage rate (applied only during non-summer months). Outage data is based on PROMOD inputs that are used by MISO.<sup>29</sup> Wind unit capacity in the MISO Illinois region was provided by MISO for each scenario, and is derated based on zonal wind capacity factors.<sup>30</sup>

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<sup>29</sup> Forced and planned outages are provided by Ventyx in the PROMOD data, and reflect Generating Availability Data System (GADS) data from the North American Electric Reliability Corporation (NERC).

<sup>30</sup> Direct communication with MISO, November 5, 2012. Capacity factors used reflect an average of the IL-F and IL-K capacity factors reported by MISO. See Appendix B to the MVP Report, p 6.

### *Economic Capacity outside MISO Illinois*

Economic Capacity from outside MISO Illinois is based on imports into MISO Illinois as determined by the PROMOD analysis. Hourly imports are calculated as the sum of gross positive inflows into the MISO Illinois region over transmission lines.<sup>31</sup> Economic Capacity is the maximum level of hourly imports into MISO Illinois across all hours of the year.

### **Scenarios**

The results presented in the body of this testimony reflect several scenarios, which are detailed below and in Table 2. Each scenario was designed by MISO in its MVP portfolio analysis, and no additional changes have been made. The definitions are provided by MISO in its MVP portfolio analysis report.<sup>32</sup>

- **Business As Usual: Low Demand** – assumes that current energy policies will be continued, with continuing recession level low demand and energy growth projections.<sup>33</sup>
- **Business As Usual: High Demand** – assumes that current energy policies will be continued, with demand and energy returning to pre-recession growth rates.<sup>34</sup>
- **Combined Energy Policy** – assumes multiple energy policies are enacted, including a 20 percent federal RPS, a carbon cap modeled on the Waxman-Markey Bill, implementation of a smart grid and widespread adoption of electric vehicles.
- **Carbon Constrained** – assumes that current energy policies will be continued, with the addition of a carbon cap modeled on the Waxman-Markey Bill.
- **Business As Usual: Low Demand High Gas** – same as the Low Demand scenarios listed above, except with higher gas prices (gas prices in 2011 were increased from \$5 to \$8/MMBtu).

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<sup>31</sup> Negative flows (that is, exports from MISO Illinois) therefore are not reflected in this calculation.

<sup>32</sup> MVP Report, p 52.

<sup>33</sup> Note that the MVP Report titles this case “Business As Usual with Continued Low Demand and Energy Growth (BAULDE).”

<sup>34</sup> Note that the MVP Report titles this case “Business As Usual with Historic Demand and Energy Growth (BAUHDE).”

- **Business As Usual: High Demand High Gas** – same as the High Demand scenarios listed above, except with higher gas prices (gas prices in 2011 were increased from \$5 to \$8/MMBtu).

**Table 2**  
**Scenario Assumptions<sup>35</sup>**

<b>Future Scenarios</b>	<b>Wind Penetration</b>	<b>Effective Demand Growth Rate</b>	<b>Effective Energy Growth Rate</b>	<b>Gas Price</b>	<b>Carbon Cost / Reduction Target</b>
Business As Usual: Low Demand	State RPS	0.78 percent	0.79 percent	BAU	None
Business As Usual: High Demand	State RPS	1.28 percent	1.42 percent	BAU	None
Combined Energy Policy	20 percent Federal RPS by 2025	0.52 percent	0.68 percent	BAU + \$3	\$50/ton (42 percent by 2033)
Carbon Constrained	State RPS	0.03 percent	0.05 percent	BAU + \$3	\$50/ton (42 percent by 2033)
Business As Usual: Low Demand, Hi Gas	State RPS	0.78 percent	0.79 percent	BAU + \$3	None
Business As Usual: High Demand, Hi Gas	State RPS	1.28 percent	1.42 percent	BAU + \$3	None

<sup>35</sup> Table 2 is based on Table 8.1 from the MVP Report.

**LMP Reduction Due to the Illinois Rivers Project  
MISO Illinois Region**

Scenario	Year	Load Weighted LMP (\$ per MWh)		Difference	Percent Difference
		Without Illinois	With Illinois		
		Rivers Project	Rivers Project		
		[A]	[B]	[C] = [A]-[B]	[D] = [C]/[A]
<b>Business as Usual: Low Demand</b>	2021	\$34.57	\$33.71	\$0.87	2.5%
	2026	\$40.95	\$39.97	\$0.98	2.4%
<b>Business as Usual: High Demand</b>	2021	\$40.86	\$39.78	\$1.08	2.6%
	2026	\$51.92	\$50.68	\$1.24	2.4%
<b>Combined Energy Policy</b>	2021	\$89.33	\$87.58	\$1.76	2.0%
	2026	\$111.96	\$106.90	\$5.06	4.5%
<b>Carbon Constrained</b>	2021	\$80.41	\$79.44	\$0.97	1.2%
	2026	\$92.97	\$91.44	\$1.52	1.6%
<b>Business as Usual: Low Demand - High Gas</b>	2021	\$43.30	\$41.53	\$1.77	4.1%
	2026	\$51.80	\$50.19	\$1.61	3.1%
<b>Business as Usual: High Demand - High Gas</b>	2021	\$54.16	\$51.85	\$2.31	4.3%
	2026	\$71.55	\$69.09	\$2.46	3.4%

Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).

**Payment Reduction Due to the Illinois Rivers Project  
MISO Illinois Region**

	Discount Rate 3%				Discount Rate 8.2%			
	Reduction in Wholesale Energy (LMP) Payments (millions \$2013)	MISO Illinois Share of IRP Costs (millions \$2013)	Net Reduction in Payments (millions \$2013)	Ratio	Reduction in Wholesale Energy (LMP) Payments (millions \$2013)	MISO Illinois Share of IRP Costs (millions \$2013)	Net Reduction in Payments (millions \$2013)	Ratio
	[A]	[B]	[C]=[A]-[B]	[D]=[A]/[B]	[E]	[F]	[G]=[E]-[F]	[H]=[E]/[F]
<b>Business as Usual: Low Demand</b>	\$696.4	\$155.4	\$541.0	4.5	\$325.1	\$119.6	\$205.5	2.7
<b>Business as Usual: High Demand</b>	\$927.8	\$155.4	\$772.4	6.0	\$430.9	\$119.6	\$311.2	3.6
<b>Combined Energy Policy</b>	\$4,229.3	\$155.4	\$4,073.9	27.2	\$1,743.9	\$119.6	\$1,624.3	14.6
<b>Carbon Constrained</b>	\$1,097.9	\$155.4	\$942.5	7.1	\$481.3	\$119.6	\$361.7	4.0
<b>Business as Usual: Low Demand - High Gas</b>	\$1,156.3	\$155.4	\$1,000.9	7.4	\$565.9	\$119.6	\$446.3	4.7
<b>Business as Usual: High Demand - High Gas</b>	\$2,053.1	\$155.4	\$1,897.7	13.2	\$958.3	\$119.6	\$838.7	8.0

Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).

**Payment Reduction Due to the Illinois Rivers Project**  
**Business as Usual: Low Demand**  
**MISO Illinois Region**

Year	Wholesale Energy Market Payments				PV Factor (3%)	PV Factor (8.2%)	Reduction in Wholesale Energy Payments	
	Without Illinois	With Illinois	Reduction	Percent			(PV as of 2013, \$ million)	
	Rivers Project	Rivers Project		Difference			PV (3%)	PV (8.2%)
	(millions \$2013)	(millions \$2013)	(millions \$2013)					
	[A]	[B]	[C]=[A]-[B]	[D]=[C]/[A]	[E]	[F]	[G]=[C]*[E]	[H]=[C]*[F]
2020	\$1,676.5	\$1,631.5	\$45.0	2.7%	0.813	0.576	\$36.6	\$25.9
2021	\$1,757.4	\$1,711.1	\$46.3	2.6%	0.789	0.532	\$36.6	\$24.7
2022	\$1,838.3	\$1,790.7	\$47.6	2.6%	0.766	0.492	\$36.5	\$23.4
2023	\$1,919.1	\$1,870.3	\$48.9	2.5%	0.744	0.455	\$36.4	\$22.2
2024	\$2,000.0	\$1,949.8	\$50.1	2.5%	0.722	0.420	\$36.2	\$21.1
2025	\$2,080.8	\$2,029.4	\$51.4	2.5%	0.701	0.388	\$36.1	\$20.0
2026	\$2,161.7	\$2,109.0	\$52.7	2.4%	0.681	0.359	\$35.9	\$18.9
2027	\$2,242.5	\$2,188.6	\$53.9	2.4%	0.661	0.332	\$35.7	\$17.9
2028	\$2,323.4	\$2,268.2	\$55.2	2.4%	0.642	0.307	\$35.4	\$16.9
2029	\$2,404.2	\$2,347.7	\$56.5	2.3%	0.623	0.283	\$35.2	\$16.0
2030	\$2,485.1	\$2,427.3	\$57.8	2.3%	0.605	0.262	\$35.0	\$15.1
2031	\$2,566.0	\$2,506.9	\$59.0	2.3%	0.587	0.242	\$34.7	\$14.3
2032	\$2,646.8	\$2,586.5	\$60.3	2.3%	0.570	0.224	\$34.4	\$13.5
2033	\$2,727.7	\$2,666.1	\$61.6	2.3%	0.554	0.207	\$34.1	\$12.7
2034	\$2,808.5	\$2,745.7	\$62.9	2.2%	0.538	0.191	\$33.8	\$12.0
2035	\$2,889.4	\$2,825.2	\$64.1	2.2%	0.522	0.177	\$33.5	\$11.3
2036	\$2,970.2	\$2,904.8	\$65.4	2.2%	0.507	0.163	\$33.1	\$10.7
2037	\$3,051.1	\$2,984.4	\$66.7	2.2%	0.492	0.151	\$32.8	\$10.1
2038	\$3,131.9	\$3,064.0	\$68.0	2.2%	0.478	0.139	\$32.5	\$9.5
2039	\$3,212.8	\$3,143.6	\$69.2	2.2%	0.464	0.129	\$32.1	\$8.9
<b>Total Payment Reduction (millions \$2013):</b>							\$696.4	\$325.1

## Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).

[2] The wholesale energy payments for CWLP and SIPCO are net of the profits of the generating units owned by CWLP and SIPCO respectively.



**Payment Reduction Due to the Illinois Rivers Project  
Combined Energy Policy Scenario  
MISO Illinois Region**

Year	Wholesale Energy Market Payments				Reduction in Wholesale Energy Payments (PV as of 2013, \$ million)			
	Without Illinois Rivers Project	With Illinois Rivers Project	Reduction	Percent	PV Factor (3%)	PV Factor (8.2%)	PV (3%)	PV (8.2%)
	(millions \$2013) [A]	(millions \$2013) [B]	(millions \$2013) [C]=[A]-[B]	Difference [D]=[C]/[A]	[E]	[F]	[G]=[C]*[E]	[H]=[C]*[F]
2020	\$4,275.1	\$4,213.2	\$61.9	1.4%	0.813	0.576	\$50.3	\$35.7
2021	\$4,531.7	\$4,437.3	\$94.5	2.1%	0.789	0.532	\$74.6	\$50.3
2022	\$4,788.4	\$4,661.4	\$127.0	2.7%	0.766	0.492	\$97.4	\$62.5
2023	\$5,045.1	\$4,885.5	\$159.6	3.2%	0.744	0.455	\$118.8	\$72.6
2024	\$5,301.7	\$5,109.6	\$192.2	3.6%	0.722	0.420	\$138.8	\$80.8
2025	\$5,558.4	\$5,333.7	\$224.7	4.0%	0.701	0.388	\$157.6	\$87.3
2026	\$5,815.0	\$5,557.8	\$257.3	4.4%	0.681	0.359	\$175.2	\$92.4
2027	\$6,071.7	\$5,781.8	\$289.8	4.8%	0.661	0.332	\$191.6	\$96.2
2028	\$6,328.4	\$6,005.9	\$322.4	5.1%	0.642	0.307	\$206.9	\$98.9
2029	\$6,585.0	\$6,230.0	\$355.0	5.4%	0.623	0.283	\$221.2	\$100.6
2030	\$6,841.7	\$6,454.1	\$387.5	5.7%	0.605	0.262	\$234.5	\$101.5
2031	\$7,098.3	\$6,678.2	\$420.1	5.9%	0.587	0.242	\$246.8	\$101.7
2032	\$7,355.0	\$6,902.3	\$452.7	6.2%	0.570	0.224	\$258.2	\$101.3
2033	\$7,611.6	\$7,126.4	\$485.2	6.4%	0.554	0.207	\$268.7	\$100.3
2034	\$7,868.3	\$7,350.5	\$517.8	6.6%	0.538	0.191	\$278.3	\$98.9
2035	\$8,125.0	\$7,574.6	\$550.4	6.8%	0.522	0.177	\$287.2	\$97.2
2036	\$8,381.6	\$7,798.7	\$582.9	7.0%	0.507	0.163	\$295.4	\$95.1
2037	\$8,638.3	\$8,022.8	\$615.5	7.1%	0.492	0.151	\$302.8	\$92.8
2038	\$8,894.9	\$8,246.9	\$648.1	7.3%	0.478	0.139	\$309.5	\$90.4
2039	\$9,151.6	\$8,471.0	\$680.6	7.4%	0.464	0.129	\$315.6	\$87.7
<b>Total Payment Reduction (millions \$2013):</b>							\$4,229.3	\$1,743.9

## Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).

[2] The wholesale energy payments for CWLP and SIPCO are net of the profits of the generating units owned by CWLP and SIPCO respectively.

**Payment Reduction Due to the Illinois Rivers Project**  
**Carbon Constrained Scenario**  
**MISO Illinois Region**

Year	Wholesale Energy Market Payments				PV Factor (3%)	PV Factor (8.2%)	Reduction in Wholesale Energy Payments		
	Without Illinois	With Illinois	Reduction	Percent			(PV as of 2013, \$ million)		
	Rivers Project	Rivers Project		Difference			PV (3%)	PV (8.2%)	
	(millions \$2013)	(millions \$2013)	(millions \$2013)						
	[A]	[B]	[C]=[A]-[B]	[D]=[C]/[A]	[E]	[F]	[G]=[C]*[E]	[H]=[C]*[F]	
2020	\$3,724.8	\$3,682.5	\$42.3	1.1%	0.813	0.576	\$34.4	\$24.4	
2021	\$3,842.5	\$3,794.8	\$47.7	1.2%	0.789	0.532	\$37.6	\$25.4	
2022	\$3,960.2	\$3,907.1	\$53.1	1.3%	0.766	0.492	\$40.7	\$26.1	
2023	\$4,077.9	\$4,019.4	\$58.4	1.4%	0.744	0.455	\$43.5	\$26.6	
2024	\$4,195.6	\$4,131.7	\$63.8	1.5%	0.722	0.420	\$46.1	\$26.8	
2025	\$4,313.2	\$4,244.1	\$69.2	1.6%	0.701	0.388	\$48.5	\$26.9	
2026	\$4,430.9	\$4,356.4	\$74.6	1.7%	0.681	0.359	\$50.8	\$26.8	
2027	\$4,548.6	\$4,468.7	\$79.9	1.8%	0.661	0.332	\$52.8	\$26.5	
2028	\$4,666.3	\$4,581.0	\$85.3	1.8%	0.642	0.307	\$54.8	\$26.2	
2029	\$4,784.0	\$4,693.3	\$90.7	1.9%	0.623	0.283	\$56.5	\$25.7	
2030	\$4,901.7	\$4,805.6	\$96.1	2.0%	0.605	0.262	\$58.1	\$25.2	
2031	\$5,019.4	\$4,917.9	\$101.4	2.0%	0.587	0.242	\$59.6	\$24.6	
2032	\$5,137.0	\$5,030.2	\$106.8	2.1%	0.570	0.224	\$60.9	\$23.9	
2033	\$5,254.7	\$5,142.6	\$112.2	2.1%	0.554	0.207	\$62.1	\$23.2	
2034	\$5,372.4	\$5,254.9	\$117.5	2.2%	0.538	0.191	\$63.2	\$22.5	
2035	\$5,490.1	\$5,367.2	\$122.9	2.2%	0.522	0.177	\$64.2	\$21.7	
2036	\$5,607.8	\$5,479.5	\$128.3	2.3%	0.507	0.163	\$65.0	\$20.9	
2037	\$5,725.5	\$5,591.8	\$133.7	2.3%	0.492	0.151	\$65.8	\$20.2	
2038	\$5,843.2	\$5,704.1	\$139.0	2.4%	0.478	0.139	\$66.4	\$19.4	
2039	\$5,960.8	\$5,816.4	\$144.4	2.4%	0.464	0.129	\$67.0	\$18.6	
<b>Total Payment Reduction (millions \$2013):</b>								\$1,097.9	\$481.3

## Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).

[2] The wholesale energy payments for CWLP and SIPCO are net of the profits of the generating units owned by CWLP and SIPCO respectively.



**Payment Reduction Due to the Illinois Rivers Project  
Business as Usual: High Demand - High Gas  
MISO Illinois Region**

Year	Wholesale Energy Market Payments				Reduction in Wholesale Energy Payments (PV as of 2013, \$ million)			
	Without Illinois Rivers Project	With Illinois Rivers Project	Reduction	Percent Difference	PV Factor (3%)	PV Factor (8.2%)	PV (3%)	PV (8.2%)
	(millions \$2013) [A]	(millions \$2013) [B]	(millions \$2013) [C]=[A]-[B]	Difference [D]=[C]/[A]	[E]	[F]	[G]=[C]*[E]	[H]=[C]*[F]
2020	\$2,643.6	\$2,511.1	\$132.6	5.0%	0.813	0.576	\$107.8	\$76.4
2021	\$2,882.2	\$2,745.9	\$136.3	4.7%	0.789	0.532	\$107.6	\$72.6
2022	\$3,120.8	\$2,980.7	\$140.1	4.5%	0.766	0.492	\$107.4	\$68.9
2023	\$3,359.4	\$3,215.4	\$143.9	4.3%	0.744	0.455	\$107.1	\$65.4
2024	\$3,597.9	\$3,450.2	\$147.7	4.1%	0.722	0.420	\$106.7	\$62.1
2025	\$3,836.5	\$3,685.0	\$151.5	3.9%	0.701	0.388	\$106.2	\$58.8
2026	\$4,075.1	\$3,919.8	\$155.2	3.8%	0.681	0.359	\$105.7	\$55.7
2027	\$4,313.6	\$4,154.6	\$159.0	3.7%	0.661	0.332	\$105.1	\$52.8
2028	\$4,552.2	\$4,389.4	\$162.8	3.6%	0.642	0.307	\$104.5	\$49.9
2029	\$4,790.8	\$4,624.2	\$166.6	3.5%	0.623	0.283	\$103.8	\$47.2
2030	\$5,029.4	\$4,859.0	\$170.4	3.4%	0.605	0.262	\$103.1	\$44.6
2031	\$5,267.9	\$5,093.8	\$174.1	3.3%	0.587	0.242	\$102.3	\$42.2
2032	\$5,506.5	\$5,328.6	\$177.9	3.2%	0.570	0.224	\$101.5	\$39.8
2033	\$5,745.1	\$5,563.4	\$181.7	3.2%	0.554	0.207	\$100.6	\$37.6
2034	\$5,983.7	\$5,798.2	\$185.5	3.1%	0.538	0.191	\$99.7	\$35.4
2035	\$6,222.2	\$6,033.0	\$189.3	3.0%	0.522	0.177	\$98.8	\$33.4
2036	\$6,460.8	\$6,267.8	\$193.1	3.0%	0.507	0.163	\$97.8	\$31.5
2037	\$6,699.4	\$6,502.5	\$196.8	2.9%	0.492	0.151	\$96.8	\$29.7
2038	\$6,938.0	\$6,737.3	\$200.6	2.9%	0.478	0.139	\$95.8	\$28.0
2039	\$7,176.5	\$6,972.1	\$204.4	2.8%	0.464	0.129	\$94.8	\$26.3
<b>Total Payment Reduction (millions \$2013):</b>							\$2,053.1	\$958.3

Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).

[2] The wholesale energy payments for CWLP and SIPCO are net of the profits of the generating units owned by CWLP and SIPCO respectively.

Increased Supply to MISO Illinois Region Due to the Illinois Rivers Project  
Business as Usual: Low Demand

	2021				2026			
	Without Illinois Rivers Project (MW)	With Illinois Rivers Project (MW)	Difference (MW)	% Difference	Without Illinois Rivers Project (MW)	With Illinois Rivers Project (MW)	Difference (MW)	% Difference
<b>Economic Capacity</b>	[A]	[B]	[C]=[B]-[A]	[D]=[C]/[A]	[E]	[F]	[G]=[F]-[E]	[H]=[G]/[E]
<b>Internal MISO Illinois</b>								
Summer Extreme Peak	12,833	13,170	336	2.6%	12,943	13,279	336	2.6%
Summer Peak	11,717	12,053	336	2.9%	11,563	11,899	336	2.9%
Off-Peak	8,035	8,371	336	4.2%	8,380	8,717	336	4.0%
<b>Imports</b>								
Summer Extreme Peak	2,456	2,968	512	20.8%	2,454	2,842	388	15.8%
Summer Peak	2,456	2,968	512	20.8%	2,454	2,842	388	15.8%
Off-Peak	2,456	2,968	512	20.8%	2,454	2,842	388	15.8%
<b>Total</b>								
Summer Extreme Peak	15,289	16,138	848	5.5%	15,397	16,121	724	4.7%
Summer Peak	14,173	15,021	848	6.0%	14,017	14,741	724	5.2%
Off-Peak	10,491	11,339	848	8.1%	10,834	11,559	724	6.7%

Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).

Increased Supply to MISO Illinois Region Due to the Illinois Rivers Project  
Business as Usual: High Demand

Economic Capacity	2021				2026			
	Without Illinois Rivers Project	With Illinois Rivers Project	Difference		Without Illinois Rivers Project	With Illinois Rivers Project	Difference	
	(MW)	(MW)	(MW)	% Difference	(MW)	(MW)	(MW)	% Difference
	[A]	[B]	[C]=[B]-[A]	[D]=[C]/[A]	[E]	[F]	[G]=[F]-[E]	[H]=[G]/[E]
<b>Internal MISO Illinois</b>								
Summer Extreme Peak	14,042	14,378	336	2.4%	14,929	15,265	336	2.3%
Summer Peak	12,080	12,416	336	2.8%	12,110	12,446	336	2.8%
Off-Peak	9,548	9,884	336	3.5%	9,519	9,855	336	3.5%
<b>Imports</b>								
Summer Extreme Peak	2,720	3,264	544	20.0%	2,483	3,103	620	25.0%
Summer Peak	2,720	3,264	544	20.0%	2,483	3,103	620	25.0%
Off-Peak	2,720	3,264	544	20.0%	2,483	3,103	620	25.0%
<b>Total</b>								
Summer Extreme Peak	16,762	17,642	880	5.3%	17,412	18,368	956	5.5%
Summer Peak	14,800	15,680	880	5.9%	14,593	15,549	956	6.6%
Off-Peak	12,268	13,148	880	7.2%	12,002	12,958	956	8.0%

Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).

Increased Supply to MISO Illinois Region Due to the Illinois Rivers Project  
Combined Energy Policy Scenario

	2021				2026			
	Without Illinois Rivers Project (MW)	With Illinois Rivers Project (MW)	Difference (MW)	% Difference	Without Illinois Rivers Project (MW)	With Illinois Rivers Project (MW)	Difference (MW)	% Difference
	[A]	[B]	[C]=[B]-[A]	[D]=[C]/[A]	[E]	[F]	[G]=[F]-[E]	[H]=[G]/[E]
<b>Economic Capacity</b>								
<b>Internal MISO Illinois</b>								
Summer Extreme Peak	13,701	14,037	336	2.5%	13,443	13,779	336	2.5%
Summer Peak	12,222	12,558	336	2.8%	12,258	12,594	336	2.7%
Off-Peak	6,382	6,718	336	5.3%	8,183	8,519	336	4.1%
<b>Imports</b>								
Summer Extreme Peak	2,299	2,660	361	15.7%	2,541	2,873	332	13.1%
Summer Peak	2,299	2,660	361	15.7%	2,541	2,873	332	13.1%
Off-Peak	2,299	2,660	361	15.7%	2,541	2,873	332	13.1%
<b>Total</b>								
Summer Extreme Peak	16,000	16,697	697	4.4%	15,984	16,652	668	4.2%
Summer Peak	14,521	15,218	697	4.8%	14,799	15,467	668	4.5%
Off-Peak	8,681	9,378	697	8.0%	10,724	11,392	668	6.2%

Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).

Increased Supply to MISO Illinois Region Due to the Illinois Rivers Project  
Carbon Constrained Scenario

Economic Capacity	2021				2026			
	Without Illinois Rivers Project	With Illinois Rivers Project	Difference		Without Illinois Rivers Project	With Illinois Rivers Project	Difference	
	(MW)	(MW)	(MW)	% Difference	(MW)	(MW)	(MW)	% Difference
	[A]	[B]	[C]=[B]-[A]	[D]=[C]/[A]	[E]	[F]	[G]=[F]-[E]	[H]=[G]/[E]
<b>Internal MISO Illinois</b>								
Summer Extreme Peak	13,183	13,519	336	2.6%	11,811	12,148	336	2.8%
Summer Peak	12,273	12,609	336	2.7%	9,775	10,112	336	3.4%
Off-Peak	5,426	5,763	336	6.2%	6,850	7,186	336	4.9%
<b>Imports</b>								
Summer Extreme Peak	2,120	2,720	600	28.3%	2,003	2,740	737	36.8%
Summer Peak	2,120	2,720	600	28.3%	2,003	2,740	737	36.8%
Off-Peak	2,120	2,720	600	28.3%	2,003	2,740	737	36.8%
<b>Total</b>								
Summer Extreme Peak	15,303	16,239	936	6.1%	13,814	14,888	1,073	7.8%
Summer Peak	14,393	15,329	936	6.5%	11,778	12,852	1,073	9.1%
Off-Peak	7,546	8,483	936	12.4%	8,853	9,926	1,073	12.1%

Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).

Business as Usual: Low Demand - High Gas

	2021				2026			
	Without Illinois Rivers Project (MW)	With Illinois Rivers Project (MW)	Difference (MW)	% Difference	Without Illinois Rivers Project (MW)	With Illinois Rivers Project (MW)	Difference (MW)	% Difference
<b>Economic Capacity</b>	[A]	[B]	[C]=[B]-[A]	[D]=[C]/[A]	[E]	[F]	[G]=[F]-[E]	[H]=[G]/[E]
<b>Internal MISO Illinois</b>								
Summer Extreme Peak	12,670	13,006	336	2.7%	12,865	13,201	336	2.6%
Summer Peak	11,429	11,765	336	2.9%	11,308	11,644	336	3.0%
Off-Peak	9,344	9,680	336	3.6%	9,247	9,584	336	3.6%
<b>Imports</b>								
Summer Extreme Peak	2,240	2,728	488	21.8%	2,222	2,719	497	22.4%
Summer Peak	2,240	2,728	488	21.8%	2,222	2,719	497	22.4%
Off-Peak	2,240	2,728	488	21.8%	2,222	2,719	497	22.4%
<b>Total</b>								
Summer Extreme Peak	14,910	15,734	824	5.5%	15,087	15,920	833	5.5%
Summer Peak	13,669	14,493	824	6.0%	13,530	14,363	833	6.2%
Off-Peak	11,584	12,408	824	7.1%	11,469	12,303	833	7.3%

Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).

**Increased Supply to MISO Illinois Region Due to the Illinois Rivers Project  
Business as Usual: High Demand - High Gas**

<b>Economic Capacity</b>	<b>2021</b>				<b>2026</b>			
	<b>Without Illinois Rivers Project</b>	<b>With Illinois Rivers Project</b>	<b>Difference</b>		<b>Without Illinois Rivers Project</b>	<b>With Illinois Rivers Project</b>	<b>Difference</b>	
	<b>(MW)</b>	<b>(MW)</b>	<b>(MW)</b>	<b>% Difference</b>	<b>(MW)</b>	<b>(MW)</b>	<b>(MW)</b>	<b>% Difference</b>
	<b>[A]</b>	<b>[B]</b>	<b>[C]=[B]-[A]</b>	<b>[D]=[C]/[A]</b>	<b>[E]</b>	<b>[F]</b>	<b>[G]=[F]-[E]</b>	<b>[H]=[G]/[E]</b>
<b>Internal MISO Illinois</b>								
Summer Extreme Peak	14,073	14,409	336	2.4%	14,866	15,203	336	2.3%
Summer Peak	12,055	12,391	336	2.8%	11,850	12,187	336	2.8%
Off-Peak	9,857	10,193	336	3.4%	9,645	9,981	336	3.5%
<b>Imports</b>								
Summer Extreme Peak	2,407	2,957	550	22.9%	2,445	2,882	437	17.9%
Summer Peak	2,407	2,957	550	22.9%	2,445	2,882	437	17.9%
Off-Peak	2,407	2,957	550	22.9%	2,445	2,882	437	17.9%
<b>Total</b>								
Summer Extreme Peak	16,480	17,366	886	5.4%	17,311	18,085	773	4.5%
Summer Peak	14,462	15,348	886	6.1%	14,295	15,069	773	5.4%
Off-Peak	12,264	13,150	886	7.2%	12,090	12,863	773	6.4%

Notes:

[1] The MISO Illinois Region includes Ameren Illinois, City Water, Light & Power (CWLP) and Southern Illinois Power Cooperative (SIPCO).