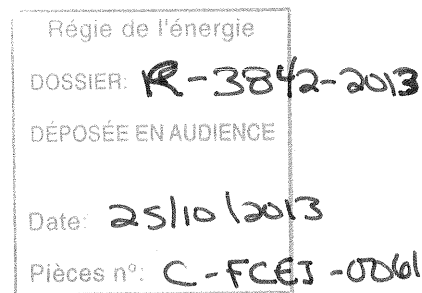


PAUL A. CENTOLELLA
Vice President

Mr. Centolella is an expert on energy economics, law, and regulation. Prior to joining Analysis Group, he was a Commissioner on the Public Utilities Commission of Ohio (PUCO). He has more than 30 years of experience as a regulator, an economic and energy consultant, and an attorney practicing public utility and environmental law. He brings to engagements a combination of expertise in energy and environmental market design and analysis, experience in complex regulatory proceedings and all aspects of utility regulation, and a background of working with standards development and emerging technologies. Mr. Centolella has contributed to the design and performed economic assessments of energy markets for power system operators and has analyzed policies and practices related to energy pricing, investments, operations, and system reliability. Mr. Centolella has served on a range of energy-related expert committees and task forces, including the Secretary of Energy's Electricity Advisory Committee, the Electric Power Research Institute's Advisory Council, and the Governing Board and Board of Directors for the Smart Grid Interoperability Panel (SGIP).

Education

1977	J.D., University of Michigan Law School
1973	B.A., Economics, Oberlin College, with honors



Professional Experience

2012-present Vice President, Analysis Group, Boston, MA

Mr. Centolella advises electric utilities, technology companies, environmental and consumer groups on strategy issues and on utility regulatory economics and policy including the development of alternative and incentive based ratemaking mechanisms and business models for addressing current challenges facing the electric power industry.

2007-2012 Commissioner, Public Utilities Commission of Ohio (PUCO), Columbus, OH

As a PUCO Commissioner, Mr. Centolella oversaw a broad range of utility services, including electric, natural gas, telephone, water, pipeline safety, and transportation, ensuring consumers access to reliable utility services at reasonable and competitive prices.

Key accomplishments while a Commissioner, included:

- Implementation of Ohio's 2008 electricity legislation that created a glide path to market pricing; included energy efficiency, peak demand reduction, advanced and renewable energy standards; required the establishment of distribution reliability standards; and led to the development of multi-year rate plans.

- Aligning Commission positions on wholesale power market issues with competition policy and securing capabilities for the PUCO to become the only commission in the region able to model power markets and forecast electricity prices.
- Development of the PJM Interconnection's Price Responsive Demand (PRD) tariff that integrates dynamic retail pricing into PJM's markets and operations, based on a foundational paper co-authored with PJM's Senior Vice President for Markets.
- Advancing Commission policies on grid modernization through workshops and proceedings on distribution reliability, advanced metering, customer access to energy usage data, privacy, cyber-security, distribution voltage optimization, and dynamic retail pricing and on-bill financing.
- Creating Ohio's Smart Grid Cluster that connected research and workforce development activities at major universities and research centers with electric utilities and technology companies.
- Helping guide the development of SGIP, a public-private partnership that has accelerated standards development by as much as 80% and created an authoritative catalog of smart grid standards.

1992-2007 Senior Economist, Science Applications International Corporation (SAIC),
McLean, VA

Managed major projects and cases in the energy practice and advised clients in the areas of:

- Energy and environmental market design, modeling, and market analysis for electric power, gas, coal, and environmental markets;
- Economic analysis related to utility regulation, electric restructuring, and energy policy; and
- Power system operations including grid modernization and deployment of real-time information systems.

Key client relationships and related accomplishments include:

- *Adoption of Midwest Independent Transmission System Operator (MISO) Energy and Ancillary Service Markets (2003-2007)*: Led the economic analysis and litigation support team for MISO to secure FERC and state commission approval of its energy markets, including modeling and market analysis of MISO and interconnected systems. Advised MISO senior management and advisory committees regarding energy and ancillary service market development.
- *Development and management of TVA's Power System Optimization Project (PSOP) (2002-2003)*: Led the economic analysis for a strategic initiative to enhance operating systems and provide enterprise wide access to real time data, resulting in more than \$400 million in operational benefits.
- *Development of the U.S. Department of Energy's policies supporting electric industry restructuring (1994-1998)*: Was principal economic consultant advising the Department's Policy Office and led one of the first major studies demonstrating that Locational Marginal Pricing (LMP), as subsequently implemented in the organized markets, is associated with significantly lower production costs and prices.

1982-1992 Senior Energy Policy Advisor and Senior Utility Attorney, Office of the Ohio Consumers' Counsel (OCC), Columbus, OH

Appeared on behalf of Ohio residential consumers in more than seventy regulatory proceedings. Represented Ohio on issues related to the 1990 Clean Air Act Amendments and was among the initial proponents of using a cap and trade approach for sulfur dioxide control.

1977-1981 Lawyer, practiced law in Washington State and California

Honors & Awards

GridWeek Leadership Award for advancing policies for modernizing the electric power system, 2011

Smart Grid Leadership Award, Demand Response Coordinating Council, 2010

Gridwise Applied Award, Gridwise Architecture Council, for development of regulations and policies advancing the principles of technology interoperability, 2010

SGIP Appreciation Award, Smart Grid Interoperability Panel, for ensuring access to information about smart grid standards, 2010

Recent Testimony and Technical Conference Comments

Direct Testimony of Paul Centolella, Vice President of Analysis Group on behalf of Environmental Defense Fund, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service, Docket No. 13-E-0030 (May 2013).

Comments of Commissioner Paul A. Centolella Supplementing his Technical Conference Remarks, Demand Response Compensation in Organized Wholesale Energy Markets, Docket No. RM10-17-000 (October 2010).

Remarks of Commissioner Paul A. Centolella, FERC Technical Conference on Demand Response Compensation in Organized Wholesale Energy Markets, Docket No. RM10-17-000 (September 2010).

Testimony of the Honorable Paul A. Centolella, Commissioner Public Utilities Commission of Ohio on Energy Efficiency Resource Standards, U.S. Senate Energy and Natural Resources Committee (April 2009).

Prepared Remarks of Commissioner Paul A. Centolella, FERC Technical Conference on Capacity Market Design (May 2008).

Testimony of Commissioner Paul A. Centolella on SB 221, Ohio House of Representatives, Public Utilities Committee (March 2008).

Selected Publications

Results-Based Regulation: A Modern Approach to Modernize the Grid (with D. Malkin) GE Digital Energy and Analysis Group Whitepaper (October 2012).

“Understanding the Value of Uninterrupted Service,” (with M. McGranaghan) *Proceedings of the CIGRE & EPRI: Grid of the Future Symposium & Data Analytics Workshop* (October 2013).

“Reexamining Rate Regulation: 1-2-3,” *Utility Horizons Quarterly* (April 2013).

“Smarter demand response in RTO markets: The evolution toward price responsive demand in PJM,” (with S. Bressler, S. Covino, and P. Sotkiewicz) *Energy Efficiency: Towards the End of Electricity Demand Growth*, Fereidoon P. Sioshansi, Editor (February 2013).

“Incentive Regulation for Grid Reliability,” *Electroindustry Magazine*, National Electrical Manufacturers Association (November 2012).

“A Pricing Strategy for a Lean and Agile Electric Power Industry,” *Electricity Policy* (September, 2012)

“The Smart Grid Needs Smart Prices to Succeed,” *Harvard Business Review Blog* (October 14, 2010).

“The integration of Price Responsive Demand into Regional Transmission Organization (RTO) wholesale power markets and system operations” *Energy*, Vol. 35, No. 4 (April 2010).

Integration of Price Responsive Demand into PJM Wholesale Power Markets and System Operations, (with A. Ott) (March 2009).

“The Future of Demand Response in RTO Energy Markets: Midwest ISO Studies on Resource Adequacy,” (with R. McNamara) *Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings*, American Council for an Energy Efficient Economy (August 2006).

Estimates of the Value of Uninterrupted Service for the Midwest Independent System Operator, Midwest Independent Transmission System Operator (April 2006).

“Energy Services in the Information Age: The Convergence of Energy, Communications, and Information Technologies,” *Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings*, American Council for an Energy Efficient Economy (August 1998).

The Structure of Competitive Power Markets, U.S. Department of Energy, Electricity Policy Office (January 1997).

“Making Performance-Based Ratemaking Consistent with Market Transformation,” *Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings*, American Council for an Energy Efficient Economy (August 1996).

The Organization of Competitive Wholesale Power Markets and Spot Price Pools (The Electric Industry Restructuring Series), National Council on Competition and the Electric Industry (1996).

“Safeguarding the Environment amid a Competitive Power Market” (with B. Hobbs), *IEEE Spectrum*, 32(3), 1995, pp. 8.

“Environmental Policies and Their Effects on Utility Planning and Operations,” *Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings*, American Council for an Energy Efficient Economy (August 1994).

“Applying Cost Allocation Principles to Demand-Side Resources: A Case Study of Industrial Opt-Out Proposals,” *Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings*, American Council for an Energy Efficient Economy (August 1994).

Public Utility Commission Treatment of Environmental Externalities (with K. Rose and B. Hobbs), National Regulatory Research Institute, Columbus, OH, 1994.

Cost Allocation for Electric Utility Conservation and Load Management Programs, principal author, National Association of Regulatory Utility Commissioners (November 1992).

Energy Efficiency and the Environment: Forging the Link (with E. Vine and D. Crawley), American Council for an Energy-Efficient Economy in cooperation with University-wide Energy Research Group, University of California, 1991.

Committees, Boards, & Delegations

Member, National Academy of Sciences Committee, Determinants of Market Adoption of Advanced Energy Efficiency and Clean Energy Technologies (2013-present)

Member, Advisory Group to Bipartisan Policy Center, Cyber Security Governance across Multiple Agencies: The Electric Power Sector (2013-present)

Member, Secretary of Energy’s Electricity Advisory Committee (2012-present), Smart Grid Subcommittee and Transmission Subcommittee

Member, Board of Directors, Smart Grid Interoperability Panel 2.0 (2012-2013), Board Executive Committee and Board Technical Committee

Member, Governing Board, Smart Grid Interoperability Panel (2009-2012); Home Area Network Task Force; System and Device Integration Working Group; Communications, Marketing and Education Working Group

Member, Advisory Council, Electric Power Research Institute (2009-2012); Advisory Council Executive Committee (2010-2012)

Member, Board of the Organization of PJM States, Inc. (OPSI) (2007-2012); Vice President (2010-2011); Secretary (2009-2010)

Co-convener of 2012 APEC Workshop on Regulatory Approaches to Smart Grid Investment and Deployment

U.S. delegation to 2011 Asia-Pacific Economic Cooperation (APEC) Senior Officials Meeting

U.S. delegation to 2012 World Forum on Energy Regulation, Quebec City, Canada

U.S. delegation to 2009 World Forum on Energy Regulation, Athens, Greece

Member, Energy Resources and Environment Committee, National Association of Regulatory Utility Commissioners (NARUC) (2007-2012)

Member, FERC / NARUC Smart Grid Collaborative and Demand Response Collaborative (later known as the Smart Response Collaborative) (2007-2012)

Member, NARUC Smart Grid Working Group (2010-2012)

Member, NARUC Climate Change Task Force (2007-2010)

Member, Technical Advisory Committee, Ohio Coal Development Office (2007-2012)

Memberships

International Association for Energy Economics (2005-present)

American Economics Association (2001-present)

Ohio State Bar Association (1982-present)

California State Bar Association (1979-present)

Washington State Bar Association (1978-present)