**Howard J. Axelrod, PhD, MBA, MSEE, BSEE**

**President**

**Energy Strategies, Inc.**

**Atlanta, Georgia**



# Areas of Specialization

*Enterprise risk management, risk and uncertainty analysis, strategic planning, executive management consulting, regulatory economics, energy planning and forecasting, prudence review, management audits and assessment, wholesale market practices and procedures, energy trading and power contract management, counterparty credit risk assessment, merger and acquisition analysis, emerging energy technology market valuation and outage preparation and storm restoration best practice assessment.*

Dr. Howard J. Axelrod has more than 40 years of experience with regulated electric and natural gas utilities. Having served as a special assistant to nationally renowned regulatory leader, NYSPSC Chairman Alfred Kahn, Dr. Axelrod led in the early development of performance-based rates and nuclear phase-in mechanisms. He has performed numerous studies and led in the development of strategies addressing such issues as competitive restructuring, strategic business and market planning, organizational development, and business risk analysis. Dr. Axelrod has performed best practice assessments relating to strategic and business planning, utility outage preparedness and enterprise risk management. Dr. Axelrod has testified before numerous state regulatory agencies and FERC on such topics as resource planning, power contract management, utility operations and management and productivity.

Dr. Axelrod is the owner and President of Energy Strategies, Inc. and has led in the development of risk management best practices as they relate to energy portfolio management, counterparty credit risk and long-term purchase power (PPA) agreement review. He supported the development and implementation comprehensive Enterprise Risk Management (ERM) programs at the NYISO, NYPA, Southern Company and the Massachusetts Municipal Wholesale Electric Company, where he also serves as the Chief Risk Officer. He has also performed numerous risk management best practice reviews for The Energy Authority, Alabama Municipal Electric Authority, Roseville Electric, American Municipal Power, NYPA, Iberdrola (NYSEG/RG&E) and PSE&G and Southern Company’s Mississippi Power.

Dr. Axelrod has also been actively involved in the development and continuous improvement of competitive wholesale electric markets. He has been retained by the New York Independent System Operator and has participated in market development activities at the ISO-NE, PJM, MISO and CAISO.

Dr. Axelrod had served as the Executive Director of CCAS (Coalition for the Commercial Application of Superconductors) a technology-based trade organization.

Dr. Axelrod was Professor of Economics (Adjunct) at Rensselaer Polytechnic Institute (1980 1982) and Russell Sage College (1982 -1983). He was also a guest lecturer at Colgate University on Energy and the Environment (1998) and Georgia Institute of Technology (2011 - 2014). He is also a Life Member of the Institute of Electrical and Electronic Engineers, a Senior Member of the Power Engineering Society, and a Professional Engineer (NYS licensed retired.).

# Relevant Experience

## Risk Management and Strategic Planning

**Dr. Axelrod has performed a range *of strategic planning engagements to over twenty major municipal and investor owned electric utilities. He has led and facilitated five strategic plans for such clients as The Energy Authority, the New York Power Authority, Omaha Public Power District, American Transmission Company and Detroit Edison (DTE). Other strategic advisory clients have included Southern Company, Georgia Power, Oglethorpe Power, PSE&G, the Edison Electric Institute, Western Resources, and the NYISO. As a best practice, he has also introduced risk management techniques and tools to evaluate business uncertainty, as well as future opportunities and threats. Ten utilities have subscribed to Energy Strategy, Inc.’s Risk Management Training seminars for which over 150 utility planners have participated.*

## System and Resource Planning

*Dr. Axelrod is a trained power system planner with Bachelor’s and Master’s degrees in Electrical Engineering – Power Systems and the completion of General Electric’s three-year Application Engineering training program. While GE’s training program included a range of disciplines including transmission and distribution analysis, Dr. Axelrod’s focus was on generation planning and the influence of load growth on reserve margins and the sizing and timing of base load generation. His doctoral thesis received from Rensselaer Polytechnic Institute dealt with decisions models relating to optimized generation expansion planning.*

*The following is a list of representative system planning assignments.*

For PSEG, performed a range of system planning studies including such topical issues as:

* The conversion of coal fired generation to natural gas as a means to capture CO2 emissions credits pursuant to emerging Kyoto Accord opportunities
* The economic benefit and impact of the acquisition of Niagara Mohawk’s Albany Steam Plant leading to the development of the Bethlehem CCGT Plant.

For the New Hampshire Public Service Commission, performed an independent system planning assessment using a comprehensive risk model to assess the conversion of a PSNH coal plant to wood chips.

For Santee Cooper Power, one of the Nation’s largest municipal electric systems performed an independent risk assessment of its long-range generation plan including a mix of coal, nuclear and CCGT base load generation. Dr. Axelrod has developed a proprietary planning model that evaluated the relative risk of a range of base load generation technologies including new nuclear, nuclear life extension, conventional and clean coal, combined cycle generation and a range of renewable technologies.

For Unitil, developed a comprehensive planning tool to evaluate the relative economics of distributed energy resource applications as a potential offset to distribution and transmission investments. Such DER applications might include solar electric installations at the customer site to reduce peak demand and associated capital requirements at stressed distribution networks.

## Wholesale Market Issues

*Dr. Axelrod has been actively involved in the development of competitive wholesale markets since its inception in the late 1990’s. He has supported the formation of efficient and effective markets in New York, New England, and PJM. Dr. Axelrod’s clientele have included a broad range of market participants including regulators, trade organizations, large energy users, independent power producers and wholesale traders and risk managers.*

*As leading energy economists, Dr Axelrod was invited in 2006 to join a small group of noted economists including the late Dr. Alfred Kahn and Nobel Laureate Vernon Smith to jointly prepare an open letter to regulators and other policy makers to refrain from abandoning the development of competitive wholesale markets because of the well-publicized rate increase sought by Baltimore Gas and Electric in Maryland.*

*Dr. Axelrod has also been a leading advocate of enterprise risk management (ERM) as a best practice for controlling transactional risks and has been retained by a number of institutions to support the implementation of such programs. His clients have included the NYISO, NYPA and Southern Company.*

*The following is a list of representative wholesale market assignments.*

* For the NYISO, Dr. Axelrod was retained to perform an independent assessment of the ISO’s risk profile. Based on his assessment numerous changes were authorized by its Board of Directors and the framework for an ERM process was authorized. The NYISO has subsequently been nationally recognized for its ERM program.
* Dr. Axelrod has also been retained by the NYISO to study other wholesale market issues. For example, he analyzed why approximately 50 percent of all wholesale electric transaction were bilateral contracts while the remainder were executed in the NYISO’s Day Ahead markets. He was also asked to study the potential effects of electric vehicle penetration on wholesale markets including the potential opportunities for vehicle to grid (V2G) applications.

* For the New York Power Authority, Dr. Axelrod led a management review of NYPA’s wholesale marketing practices including procurement protocol and risk management procedures.

* Dr. Axelrod was again retained by NYPA to assist in the development and implementation of an enterprise-wide risk management program.

* For a range of independent power suppliers, Dr. Axelrod has been retained to support the development of competitive market strategies. Such clients have included: Cogentrix (a subsidiary of Goldman Sachs), Mirant, PSEG Trading, Sempra, and USPG.

## Merger and Acquisition Analysis

Dr. Axelrod has extensive experience in the areas of strategic planning and merger and acquisition analysis. He has supported a number of electric and gas utilities develop strategic and business plans. On several instances he has facilitated senior management strategic retreats. Dr. Axelrod has also performed independent studies assessing the acquisition of electric and gas utilities. For Commonwealth Edison he was instrumental in the company's successful defense of a City of Chicago takeover bid. He also performed acquisition studies of Long Island Lighting Company's gas division, Finger Lakes Gas Company and Savannah Electric. For a major southeast utility, he performed risk analysis of a number of gas acquisition opportunities.

Dr. Axelrod has completed strategic planning, merger and acquisition analysis assignments on behalf of Ameritech, Commonwealth Edison, Brooklyn Union Gas, NY and other confidential utilities.

## Market Analysis, Marketing and Competitive Assessment

Dr. Axelrod has performed a wide range of studies in the areas of market analysis, sales forecasting and economic development. He is an experienced strategic planner, marketing facilitator and process analyst. He has supported a number of major utilities develop comprehensive business and marketing strategies focused for both customer retention and expansion. He has also been retained to review and assess planning, forecasting and marketing processes and recommend changes in response to the transition to a competitive energy market. He has helped utilities develop customized marketing programs for key customers accounts, area and economic development, electric and gas technology assessment, gas main extension strategies and natural gas vehicle programs.

His clients have included Unitil, Ameritech, Superpower, Public Service Electric and Gas, Commonwealth Energy, Brooklyn Union Gas, Orange & Rockland Utilities, Georgia Power, Oglethorpe Power, New York State Electric & Gas, and Western Resources Commonwealth Energy, and Unitil.

## Utility Rate-making and Regulatory Policy Analysis

Dr. Axelrod has extensive ratemaking experience having served as a staff member of the New York Public Service Commission and as Director of Utility Intervention for the New York Consumer Protection Board. He has testified in over 75 proceedings and managed over 200 rate cases. As a management consultant for the last 18 years, Dr. Axelrod has supported the development of a range of regulatory strategies for major electric and gas utilities.

Dr. Axelrod has provided expert testimony in areas addressing cost of capital, wages and salaries, labor and total factor productivity, energy and sales forecasts, excess capacity, rate phase-ins, economic impact, nuclear "need for power" prudence, affiliate transactions and promotional rate practices. He has also been lead consultant in rate settlement proceedings before state and federal regulators.

His clients have included Georgia Power, Northeast Utilities, Western Resources (KPL), Brooklyn Union Gas, Boston Edison, Eastern Utilities Associates, Midwest Resources (Iowa Power), Oglethorpe Power, Northern Indiana Public service, Old Dominion and New York State Electric and Gas.

## **PROFESSIONAL EMPLOYMENT HISTORY**

1995 - Present Energy Strategies, Inc., Founder and President

1994 - 1995 R. J. Rudden Associates, Vice President

1988 - 1994 Resource Management International (now Navigant), Vice President

1984 – 1988 Planmetrics, Vice President, Regulatory Strategy

1981 - 1984 NYS Consumer Protection Board - Director

1980 - 1981 NYS Energy Research and Development Authority - Project Manager

1976 - 1980 NYS Consumer Protection Board - Chief Engineer

1971 - 1976 NYS Public Service Commission - Sr. Research Analysis

1965 – 1971 General Electric Company, Application Engineer

## **PUBLICATIONS AND PRESENTATIONS**

“Comments of Dr. Howard J. Axelrod Energy Strategies, Inc. In Response to Downeast LNG’s

Revised Purpose and Need Statement Filed August 21, 2009 Accession Number 20090821-5025

(FERC)” prepared on behalf of Three-Nation Alliance (Save Passamaquoddy Bay-U.S., Save Passamaquoddy Bay-Canada, Inc., and Nulankeyutomonen Nkihtahkomikumon) and its individual members / interveners.

“An Assessment of Energy Needs in Westchester County: The Economic Impact of Rising Energy

Prices and Shortages in Supplies”, Axelrod, H., prepared for the Westchester Business Alliance, January, 2008.

“An Independent Assessment of the Environmental and Economic Impacts Associated with the

Closing of the Vermont Yankee Nuclear Plant”, Axelrod, H. prepared for the Vermont Energy Partnership, November 2008.

“The Fallacy of High Prices”, Axelrod, H., DeRamus, D, and Cain, C., Public Utility Fortnightly, November, 2006

“Sarbanes-Oxley: Implications for Public Power”, Northeast Public Power Association Annual Conference, August, 2006

“POLR in Pennsylvania”, presentation to the Pennsylvania Energy Associations’ Annual Conference, Sept 2000

“Brand Management: A Primer on Branding”, an EPRI White Paper, December, 1999

“An Assessment of the Market of the Market Potential for Value Added Services” , unpublished, June 1997

“Strategies to Develop a National Customer Base”, presented at the 1997 Annual Executive Marketing Conference sponsored by the Institute of Gas Technologies.

 “Value-Based Pricing: Being Competitive and Profitable”, presented at the DA/DSM Annual Conference, January 28 - 29, 1997

 “The Role of Peak Shaving in an Open Access Industry”, presented at the Institute of Gas

Technology conference on Peak-shaving: Issues, Answers & Strategies, June 24-26, 1996

"Financial Implications of a Changing Natural Gas Marketplace," presented at the Institute of Gas Technology conference on Energy Marketing, December, 1995.

“Where Will New Energy Markets Emerge and How Quickly?”, presented at the Institute of Gas

Technology conference on Natural Gas Marketing, September, 1994

"The DSM-Marketing Linkage," paper presented at the GRI and A.G.A. Workshop on Gas Load Research and Demand Analysis, May, 1994.

"Managing Your Gas IRP," paper presented at the Northeast Gas Market Annual Meeting, June 1993.

"Risk and Uncertainty in Utility Planning," with James Letzelter, Resource, Volume 4, Number 2, Summer, 1992.

"Was Your Winter Cold Enough?" Resource, Volume 4, Number l, Spring 1992.

"Rocky Mountain Pumped Storage Validation Report," prepared for Oglethorpe Power, June 1991. "Putting Your Forecasters Back to Work," Resource, Volume 1, Number 1, Spring 1991.

"An Independent Assessment of the Costs, Benefits and Risks Associated with a Municipal Takeover of Commonwealth Edison's Chicago Divisions," prepared for Commonwealth Edison Company, 1988.

"The Economic Impact of Electric Rate Increased Options in Georgia," prepared for Georgia Power November 1986.

"Predicting the Next Regulatory Crisis: An issues Management Approach," appeared as a chapter in a book entitled The Future of Electrical Energy: A Regional Perspective of an Industry in Transition, 1986

"Analysis of Brooklyn Union Gas Company's Proposal to Purchase the Long Island Lighting Company's Gas Operation," prepared for Brooklyn Union Gas Company, July 1985.

"Economic Analysis of Incremental Electric Generation Sizing and Timing," Doctoral Thesis, Rensselaer Polytechnic Institute, May, 1981.

"Factors Influencing Industrial Coal Conversion in New York State," with Dr. Fred Strinisa, paper presented at the Governor's Conference on Expanding the Use of Coal in New York State, May, 1981.

"Utilization of Solid Waste in New York: A State Governor's Positive Action Program," paper presented at the First International Conference on Conversion or Refuse to Energy, Montreux, Switzerland, November, 1975.

"Measuring Electric Utility Productivity," appeared as a chapter in a book entitled, Public Utility, August 1975.

"Prospects of New and Evolving Technologies," with P. Mathusa, D. Stricos, H. Guttman and B. Dwyer, New York Public Service Commission, April 1975.

"Urban Applications of Fuel Cells," with Parker Mathusa, Electric Light and Power, 4/72.

## **AFFILIATIONS AND HONORS**

Life Senior Member, Institute of Electrical and Electronics Engineers

Professional Engineer - Licensed in the State of New York (retired)

Member, Professional Risk Managers International Association

## **EDUCATION**

Rensselaer Polytechnic Institute in Troy, New York, Ph.D., Managerial Economics, 1981

State University of New York in Albany, MBA, Organizational Theory and Marketing, 1976

Union College, Schenectady, NY, Graduate Courses in Industrial Engineering, 1968 - 1970

Northeastern University in Boston, Massachusetts, M.S.E.E., Power Systems, 1971

Northeastern University in Boston, Massachusetts, B.S.E.E., Power Systems, 1970