

Professional Summary:

- ▶ Transmission and generation planning professional with years of experience providing transmission planning, generation expansion planning, production cost modeling, control area operations and design, and general consulting services to electric utilities, the steel industry, and fuel suppliers in the United States and internationally.
- ▶ Former member of the Board of Directors of the Western Regional Transmission Association who has participated in the formation attempts of several ISOs/RTOs and testified as an expert witness on resource RFPs, transmission prudence, scheduling, and ancillary service issues in both federal and state cases.

Transmission Experience Summary:

- ▶ Managed 25 Transmission and Generation Expansion Planners for Public Service Company of Colorado using Integrated Resources and Least Cost Planning for expanding the generation, bulk power, and load serving transmission systems.
- ▶ Served as past Secretary/Treasurer and Board Member for the Western Regional Transmission Association. Participated in Transmission Owner and Stakeholder Committees in the formation or attempts to form the following ISO/RTOs:
 - Colorado/Wyoming
 - IndeGO
 - MISO
 - SeTrans
- ▶ Participated as a member of the WECC Planning Coordinating Committee and the Regional Planning Policy Committee.
- ▶ Provided state regulatory filings and/or expert witness testimony cases related to: transmission line CPCNs, alleged RFP bidding irregularities, prudence hearings, and rate relief for a southern steel mill.
- ▶ Served as a Federal Claims Court expert witness for trial regarding excessive ancillary service charges for load regulation and frequency control for an arc furnace in Arizona.
- ▶ Submitted testimony that influenced Portland General Electric, to settle the case for improper receipt of congestion relief payments in the Death Star scheduling procedures in the California ISO.
- ▶ Consulted for Florida Power & Light in the federal anti-trust suit by 17 municipal cities against FP&L for failure to provide wheeling service to deny access to nuclear generation ownership.
- ▶ Studied benefits, synergies and worked on negotiating details of Merger and Acquisitions of utilities in Nevada, Kansas, and Colorado using PROMOD and transmission transfer path capacities—responsible for addressing post merger problems with executory contracts.
- ▶ Designed and negotiated changing control area metering to move M&A acquired loads and generation into buyer's control area to eliminate hourly schedules and save transmission contractual losses.
- ▶ Assisted a national wind developer in an interconnection request in Wyoming. Twice assisted IC prime movers with transmission siting for RFPs in Colorado.
- ▶ Supported American Transmission Company in selecting the best alternative 345 kV transmission project lowering congestion and Locational Marginal Prices by using a bus injection study with PSSE.
- ▶ As a senior engineer, performed powerflow and stability studies. Recently reviewed stability studies and powerflows in connection with CFC loan applications at the following Power Stations:
 - Anadarko
 - Plum Point
 - CR Smith
 - Turk
 - Weston 4
- ▶ Studied regulatory issues in ERCOT, CAISO, MISO, WECC and PJM, and five-year plan in ISO NE.
- ▶ Served as Independent Engineer for lenders for the merchant transmission projects, including: MATL, the Trans Bay Cable, the Sharyland DC tie to Mexico, and the sale of the Neptune RTS. Researched regulatory requirements for return of revenue requirements of the transmission facilities as well as reliability issues.
- ▶ Submitted comments to FERC on the Standard Market Design (SMD) NOPR as a consultant to the New Orleans Utilities Regulatory Office. Familiar with FERC transmission service and capital cost assignment policies for interested and non-interested jurisdictional entities. Worked on loan applications for interconnecting generators checking System Impact and Facilities Studies, transmission service agreements, and interconnection agreements.

- ▶ Calculated MW and MWH losses for the transmission and distribution systems of Vectren and Public Service Company of Colorado.
- ▶ Managed a team of eight transmission planners to produce studies of RFP bids and the costs of Network Upgrades and Interconnection Facility costs. Exercised leadership by briefing each engineer on the study design for each bid alternative. Enforced ex parte rules to ensure absolute fairness and uniform treatment of bidders.
- ▶ Promoted to Manager of Utility Sales for an Internet-based SCADA system developer.
- ▶ Completed studies of the capital and O&M costs of the SWIP and Overland DC transmission systems.
- ▶ Miscellaneous: Chairman of WECC Ad Hoc Committee to raise the transfer limit of TOT 3 in Colorado. Chairman of committee to design a new outage records system for Public Service Company of Colorado. Wrote an APL program to calculate EMF field strengths at various distances from single and double circuit lines. First person to justify that a project (Lamar DC Tie) complied with the requirements of the WECC Regional Planning Policy Committee guidelines.

Generation Planning Experience Summary:

- ▶ Created NPV-based generation expansion plans for Montana Power, Montana Dakota Utilities, and Alberta Power.
- ▶ Load management studies for Public Service Company of Colorado, El Paso Electric, and the City of Colorado Springs.
- ▶ Created Loss of Load Probability studies for predecessor to Inland Power Pool and for WECC reliability investigation of Reserve Criteria.
- ▶ Developed PROMOD Studies of Powder River Coal quantities for the use at Oklahoma Gas and Electric and Public Service Company of Colorado.
- ▶ Wrote a FORTRAN program to perform bus bar and delivered costs for new generation facilities at Wyodak, Pawnee, Elk River, Creston, and La Junta.
- ▶ Created power supply forecasts (\$/MWH and \$/MW) for Florida Public Utilities for Amelia Island and Fernandina Beach for 15 years, taking into consideration the capital budgets and generation costs of Florida Power & Light and Jacksonville Electric Authority.
- ▶ Ran PROMOD studies of Air Quality Control alternatives for coal-fired stations.
- ▶ Conducted Econometric and weather-adjusted forecasting of peak loads, and forecasts of bus loads for 15 years.
- ▶ Completed market studies of generation costs in Michigan and Montana/Alberta using MarketPower and PROMOD.
- ▶ Wrote hourly production cost models using an HP41-C and using an IBM mainframe using APL.

Educational Background

- M.S. Electrical Engineering, University of Colorado, Denver
- B.S. Biology University of Colorado, Denver
- B.S. Mechanical Engineering, University of Arizona
- USAF, Air University correspondence school in Aircraft Maintenance, Level 5
- USAF Jet Fighter Aircraft Maintenance School, Honor Graduate

Professional History and Highest Position

- Public Service Company of Colorado, 1970-1978 and 1983-1999; Manager Electric System Planning
- Stone & Webster Management Consultants, Inc., 1978-1983; Consultant
- M2M DataCorp, 1999-2001; Manager of Utility Sales
- Energy and Resource Consulting Group, LLC, 2001-2004; Senior Consultant
- E3 Consulting, LLC, 2004-2009; Managing Director