



About MRW & Associates, LLC

MRW & Associates, LLC is internationally recognized for its broad expertise in electric power and fuel markets. We combine an in-depth knowledge of these markets with rigorous economic and technical analysis to help our clients assess market opportunities, develop business strategies, and address regulatory issues.

MRW offers its clients a comprehensive portfolio of consulting services in the areas of power market analysis, regulatory and litigation support, natural gas market analysis, and retail market support. Because we maintain a singular focus on the energy industry, our industry expertise is both deeper and broader than many other consulting firms. We understand the strategic implications of evolving regulatory models, emerging technologies, and changing market dynamics and we put this knowledge to use to serve our clients' interests. Practical research, qualitative and quantitative analysis, and industry expertise underpin all of MRW's work and ensure that our client recommendations are sound.

Established in Oakland, California in 1986, MRW early-on built a solid reputation for delivering local insights on power and fuel markets in the western United States as well as intervening successfully in legislative and regulatory proceedings on our clients' behalf. Over this time, MRW has been involved in landmark developments such as the emergence of the independent power industry and the deregulation of California's electricity and natural gas industries.

Today, MRW continues to deliver high quality, superior market insights, analysis, and client support on a national and international level. The company has undertaken engagements in more than twenty different states, including nearly every state in the western U.S. Internationally, MRW has advised clients on projects in Argentina, Bolivia, Canada, China, India, Indonesia, Korea, Mexico, and Vietnam.

Our client base includes major financial institutions, private power developers, power marketers, municipalities, Fortune 500 industrial companies, commercial end-users, natural gas pipelines and storage service providers, regulatory agencies, and other strategic players in the energy sector. MRW's team of professionals, with an average of ten years of industry experience, include specialists in power market modeling, financial analysis, regulatory processes, utility rate design, legislative analysis, commodity procurement, energy use analysis, contract negotiations, transmission planning and pricing, and strategic planning.

For more information about MRW, please visit our website at www.mrwassoc.com.



Regulatory & Litigation Support

Industry restructuring in electricity and natural gas markets has brought market forces to bear on these traditionally regulated industries. The emerging model at the federal and state levels is the creation of competitive markets through the unbundling of formerly regulated monopoly services. The move to deregulate some segments of electricity and gas markets has led many regulatory agencies to open inquiries into stranded cost estimation, asset divestiture, consumer protection in competitive markets, and market power mitigation. At the same time, many facets of electricity and natural gas markets remain subject to some form of regulation by various agencies at the state and federal level.

The firm combines its expertise in finance, economics, and policy with its extensive knowledge of the energy industry's evolution to provide invaluable insights as the regulatory process unfolds. MRW provides a full range of services associated with regulatory intervention before federal and state regulatory agencies, including:

- preparing discovery requests;
- sponsoring expert testimony;
- developing or evaluating settlement scenarios;
- supporting cross examination efforts; and
- writing and submitting briefs.

MRW has actively participated in regulatory proceedings at the state and federal level dealing with stranded cost estimation, asset divestiture, performance-based ratemaking, marginal costs and revenue allocation, rate design and unbundling, utility mergers, and market power.

In addition to supporting our clients' participation in regulatory proceedings, MRW also provides support in commercial litigation cases. MRW assists law firms with litigation, mediation, and arbitration related to antitrust, commercial damage claims, and other legal matters. These cases often involve the presentation of complex economic issues related to profitability, market competition, and fair business conduct. MRW assists in all phases of the litigation process, working with attorneys to develop case strategy, conduct discovery, prepare depositions, submit expert testimony, and analyze settlement scenarios and estimate damages.



Power Market Analysis

Deregulated power markets present industry players with a range of new business opportunities. Competitive wholesale electricity markets, direct retail sales to end-users, and ancillary services markets are several aspects of the new electric power market that industry participants must consider in order to position a project for maximum profitability and minimal risk. In this environment, industry players need to stay abreast of a wide range of issues, including changes in regulatory policy, competitors' operations, fuel market trends, and wholesale power market trends. Sound project and market evaluations also play a crucial role in the successful development and financing of power projects. The emergence of merchant power projects, which are not backed by contracts for guaranteed power sales, underlines the need for solid analysis of the viability of projects.

MRW employs a variety of analytical tools to help clients make informed decisions about business opportunities within a local or regional power market. MRW provides sophisticated modeling to create forecasts of wholesale power prices, avoided costs, and retail electric rates. MRW also maintains a complete database of historical power prices posted at the California Power Exchange. At the same time, MRW's analyses, shaped by a deep appreciation for the regulatory and market environment, offer a comprehensive view of a particular power market. MRW offers a range of services in this area, including:

- forecasting wholesale power prices using power market simulation models;
- analyzing power market bidding dynamics;
- developing marketing strategies for power sales;
- reviewing transmission access issues;
- valuing ancillary services;
- identifying potential development or acquisition opportunities; and
- assessing the regulatory and policy environment.

MRW has substantial experience evaluating the viability of power projects on behalf of project developers, equity investors, and the investment banking community. MRW is often called upon to assess the impact of contract terms, transmission interconnection, and fuel supply arrangements on a project's future revenue stream.

Internationally, many countries are moving toward restructured or privatized power markets. Although the issues or business opportunities may differ from those in deregulated U.S. markets, the analytical approach to evaluating a power market is often similar. MRW has completed analyses of local and regional power markets in Bolivia, Canada, China, India, Indonesia, Korea, Mexico, and Vietnam.



Natural Gas Market Analysis

North American natural gas markets are experiencing robust growth, spurred in large part by significant increases in demand from power generators. At the same time, industry players and consumers are confronting several other market issues: new pipeline capacity is continually changing basis differentials among markets; several states continue to push for further regulatory reform and unbundling; and corporate mergers are changing business strategies.

MRW offers a wide range of analytical and advisory services designed to provide information about and insight into the competitive and regulatory forces shaping the natural gas industry. MRW assists its clients in reviewing gas supply and transportation options and choosing the options best-suited for their circumstances. On behalf of lenders, MRW will evaluate the economic soundness of a project's fuel supply arrangements relative to the evolving natural gas and power markets. MRW also provides economic and market analysis in support of clients' efforts in regulatory proceedings before state and federal agencies or in commercial litigation. MRW's services in this area include the following:

- evaluating gas supply procurement and transportation strategies;
- soliciting and negotiating gas supply procurement and transportation agreements;
- representing clients' interests in regulatory proceedings;
- providing economic and market analysis in support of commercial litigation;
- tracking industry developments that affect future natural gas supplies and prices; and
- forecasting short- and long-term natural gas prices.

Finally, because of our corporate expertise in electricity markets, MRW is qualified to assist clients in understanding the interplay of natural gas and electricity markets. In many regions of the United States, natural gas-fired power plants are becoming the marginal price-setting units. MRW helps its clients to assess the merit order of dispatch in a regional power market through an evaluation of short-term gas price trends and basis differentials.



Retail Market Support

The advent of retail competition in gas and electricity markets has fundamentally altered energy markets. For the first time, retail customers have the opportunity to choose their energy providers and can base their energy supply decisions on their unique situations. In response, many new players have entered the market and traditional utilities are transforming their operations to respond to the competitive marketplace. To win customers and increase market share, energy providers are expanding their product offerings to include not only commodity supply but also a broad array of energy management and value-added services, ranging from energy efficiency upgrades to providing detailed load and billing data via the Internet.

In this new environment, a retail customer must understand how much energy a facility uses and the manner in which it is used. With this information, a company will be able to identify opportunities for obtaining competitive energy commodities, optimizing energy use and maximizing energy savings. MRW provides expert analysis and strategic counseling to retail energy customers throughout the energy procurement process, from developing an overall energy supply strategy to analyzing energy consumption patterns, and to finalizing supply agreements. MRW offers the following services in this area:

- developing energy procurement strategies;
- implementing energy procurement strategies, including negotiating power purchase contracts, writing requests for proposals, and evaluating responses;
- analyzing energy usage data and facility operations;
- evaluating energy objectives;
- monitoring policy developments that affect the retail market;
- integrating electric power and fuel supply contracts; and
- developing risk management strategies.

MRW has worked with small and large commercial, institutional, and industrial clients in all of these capacities. For example, MRW assisted a large California municipality to procure commodity power and specialized services by preparing an RFP, analyzing the proposals, and advising the city officials throughout negotiations.



Selected Engagements

This select list of representative engagements illustrates MRW's capabilities in each of the firm's four main practice areas.

Regulatory and Litigation Support

- For a coalition of energy service providers, MRW submitted testimony before the California Public Utilities Commission concerning billing credits customers receive when they choose non-utility energy providers, such as credits for metering and billing services. To substantiate our testimony, MRW analyzed the embedded short-run and long-run marginal costs of the three major California utilities for providing these services.
- On behalf of a major power marketer, MRW submitted testimony in the 1999 General Rate Case for Pacific Gas & Electric (PG&E). MRW staff testified in the areas of regulatory policy, administrative and general expense, distribution operations and maintenance, distribution and transmission capital additions, customer information systems, and customer records and accounting. MRW presented testimony on the level of allowable costs as well as policy issues associated with recovery of such costs. PG&E requested an increase in revenues in excess of \$1 billion; the California Public Utilities Commission ultimately authorized an increase of only \$452 million.
- On behalf of a non-profit health industry organization, MRW submitted testimony in the proceedings before the Pennsylvania Public Utilities Commission regarding stranded cost estimates for Penelec, Duquesne Light Company, and West Penn Power Company. MRW assessed the policy implications of securitization, evaluated how to maximize the benefits to ratepayers, and analyzed the potential impacts of large cash infusions to the utilities.
- MRW provided technical expertise and economic analysis to the legal counsel of one party to a commercial litigation dispute. The dispute centered on claims of breach of contract between the owner of several power production facilities and the utility purchasing the energy and capacity under long-term contracts. MRW analyzed short- and long-term power prices, reviewed power purchase contract terms, and contributed expert advice on historical market activity. MRW also advised the attorneys on deposition content, data requests, and expert witnesses, as well as overall legal strategy for the case.



Selected Engagements (cont.)

Power Market Analysis

- MRW was selected to be the power market consultant to a merchant power plant constructed in the Western United States. MRW developed a detailed market simulation model to forecast market-clearing power prices in the California market. Our power price forecast enabled the lead lender to evaluate the project's ability to repay the debt financing in a competitive wholesale market environment. Based on our overall power market assessment, the project became the first true merchant power plant to be financed successfully on a project finance basis. MRW played a similar role in the re-financing of several cogeneration projects and the divestiture of power plants by California's investor-owned utilities.
- MRW evaluated fuel supply and transmission interconnection issues and made a preliminary assessment of energy revenues for a 520 MW natural gas-fired combined cycle greenfield power project located in the Western United States. Specifically, MRW analyzed natural gas supply reserves and transportation options to supply the facility with natural gas. MRW also estimated the costs of natural gas for the facility over the life of the project. MRW evaluated the existing transmission system in the area and the potential for transmission congestion to affect the project's ability to deliver power into key markets. Finally, MRW developed power price forecasts under a base case and alternative scenarios. This plant is scheduled to enter commercial operation in 2001.
- MRW advised the international lenders considering financing a proposed 2x300 MW coal-fired power plant located in Hubei Province in the People's Republic of China. For this engagement, MRW analyzed national and provincial economic trends, regulatory reforms, and the future development of natural gas for power generation in China. MRW built a data set to simulate the Hubei power market to understand the project's competitiveness vis-à-vis other generating resources in the region. Our analysis of the project accounted for the impact of the Three Gorges Dam.
- MRW developed forecasts of future hourly power prices in the Pacific Gas & Electric service territory in California for an owner of a Qualified Facility. The forecasted prices provided the plant owner with a proxy for the day-ahead zonal Power Exchange (PX) price that the plant would receive if it were to exercise its one-time option to switch from the current formula-based short-run avoided cost pricing mechanism to market-based pricing. MRW also analyzed the regulatory risks arising from the potential need to reconcile an interim pricing mechanism used by the PX and a future mechanism that could be set by the California Public Utilities Commission whereby some portion of the PX price may be considered a capacity payment.



Selected Engagements (cont.)

Natural Gas Market Analysis

- On behalf of a natural gas storage services provider, MRW assessed the reasonableness of a gas storage pricing mechanism proposed by a power marketer seeking a price discount for its gas storage requirements. The proposed pricing mechanism was defined in terms of a spark spread, which was to be a function of future gas and electricity prices in the local market. MRW investigated the linkage between the daily city gate gas price and the zonal power price by performing regression analyses on the historic data. Based on this statistical analysis and our assessment of future gas and electric prices, we recommended to our client that it seek an alternative and more favorable pricing mechanism.
- MRW advised the majority equity owner of a cogeneration project on the acquisition of long-term natural gas supplies for the 26 MW plant. On behalf of the owner, MRW issued a Request for Proposals, evaluated the responses, and developed a short list of recommended suppliers for the investor to review. MRW provided an independent review of all of the proposals, resulting ultimately in substantial savings to the project and its owner.
- On behalf of a major gas marketer and shipper, MRW provided expert witness testimony at FERC responding to Pacific Gas Transmission's (PGT) request for rolled-in transportation rates. In addition to providing a comprehensive review of federal and California state pipeline rate design policy, MRW testified on the validity of sophisticated gas price models that purported to demonstrate the impact of the PGT Expansion on California natural gas prices.

Retail Market Support

- MRW assisted a national hospital chain in reviewing its electricity and gas costs on an aggregated and facility-by-facility basis. MRW compiled various types of facility-specific data, including electric consumption and demand levels. Using this information, MRW explored energy cost savings options such as energy efficiency improvements and fuel switching, switching electric tariffs, renegotiating existing fuel supply contracts, building cogeneration units, and obtaining discounts off the cost of bundled utility service by taking service from a power marketer. Ultimately, MRW helped our client to issue requests for proposals for demand-side management services and for energy commodity services at its California facilities and assisted with the evaluation of the subsequent responses and final selection of a supplier.



Selected Engagements (cont.)

- MRW developed a decision analysis process to assist a large Midwestern university in its evaluation of cogeneration and the expansion of the campus' chilled water system. MRW identified the major threshold issues the university needed to consider in each case and created a process for the university to follow in making a decision. MRW also analyzed the cost-effectiveness of various solutions and facilitated discussions between university personnel and the local utility, an energy service provider, and engineering firms.
- MRW assisted the City of San Diego in developing a comprehensive strategy to take advantage of the opportunities presented by energy industry restructuring. An important part of the strategy involved outsourcing some of the city's energy management functions to a third party. MRW combined an historical energy use analysis with the city's development plan to prepare a complete profile of the city's energy procurement needs. After these initial steps, MRW helped the city to prepare an RFQ and subsequently an RFP for energy services. MRW evaluated the responses based on various criteria and then assisted the city in negotiating and selecting a provider.
- On behalf of a northern California city, MRW evaluated proposals from several energy service providers seeking to serve as the city's agent at a former military base after the city established a public municipal utility and assumed control of the electrical distribution system following the base's closure. MRW performed a financial analysis of the proposals on behalf of the city and supported negotiations with the selected agent. MRW also assisted the city in assessing the feasibility of purchasing fuel cells for installation at a new city hall. MRW evaluated the costs of installing and operating the fuel cell cogeneration units compared to the alternative cost of purchasing electricity and natural gas. MRW's assessment also identified qualitative benefits and risks of installing fuel cells, including an assessment of air emission reductions, and presented these findings along with the financial analysis for evaluation by city staff.



MRW & Associates, LLC
Principals and Associates

MARK FULMER - Principal

- Experienced professional in energy-related technical, economic, and policy analysis
- Expert witness in numerous regulatory proceedings in the U.S. and Canada
- Specialist in electric retail competition (including Community Choice Aggregation)
- Experienced in utility cost allocation, rate forecasting, and rate design
- Experienced in least-cost planning and demand-side management analysis
- Experienced in power supply and energy efficiency technology assessment
- Former Research Assistant at Princeton University's Center for Energy and Environmental Studies

DAVID N. HOWARTH - Principal

- Interdisciplinary energy specialist, including quantitative and qualitative analysis of economic, technical, and policy issues in the electric and natural gas industries
- Expertise in performing project due diligence, financial analysis, and valuation for independent power projects, including renewable energy facilities
- Experienced with renewable energy and greenhouse gas policy development and implementation
- Experienced with distributed generation and utility rate analysis for end use customers

WILLIAM A. MONSEN - Principal Consultant

- Expert witness in numerous regulatory and legal proceedings
- Specialist in competitive bidding systems for electric resources
- Expertise in modeling utility financial and operational systems
- Specialist in least-cost planning and demand-side management analysis
- Former Energy Economist and Decision Support Coordinator for Pacific Gas & Electric Company
- Former Staff member of University of Wisconsin-Madison Solar Energy Laboratory

LAURA NORIN - Senior Project Manager

- Expert witness in numerous regulatory proceedings on California energy issues
- Specialist in utility ratemaking and retail rate forecasting
- In-depth experience with California energy policy and regulatory issues and the interplay between energy markets and regulations
- Expertise in quantitative and strategic analysis of energy issues
- Former Research Associate at Lawrence Berkeley National Lab's Environmental Energy Technology Division



MRW & Associates, LLC
Principals and Associates

ANNA CASAS – Senior Associate

- International energy market experience with an emphasis on rate and cost analysis
- Expertise in developing and analyzing models to answer energy-related questions, including forecasts of energy demand, supply, and rates
- Previous work as an engineering developing gas, electrical, and environmental systems
- Background in industrial engineering and renewable energy studies

BRANDON CHARLES – Senior Associate

- Expert witness in regulatory proceedings on utility ratemaking and other energy issues
- Experienced in quantitative and qualitative analysis of electricity markets, with particular expertise in utility rate analysis and forecasting
- In-depth expertise in distributed generation economics and policy
- Background in Economics
- Former Senior Market Analyst with a stationary fuel cell manufacturer; prior positions with the biotechnology industry and a large international law firm

NAINA GUPTA – Associate

- Experience in quantitative and qualitative analysis across a broad range of electricity issues, including retail electricity rates, California energy policy, renewable power procurement, and cost of service analysis
- Background in engineering and energy studies, including qualitative and quantitative analysis of energy-related issues
- Former Graduate Student Researcher at the University of California, Berkeley, and Lawrence Berkeley National Lab

GEORGE RANDOLPH – Associate

- Experienced with renewable energy technology and policy analysis
- Background in mechanical engineering and atmospheric science, with a focus on wind resource assessment
- Former Research Fellow at Project Drawdown, whose work included modeling the economic and climate impact of micro wind turbines, wave/tidal energy, and run-of-river/in-stream hydro systems
- Experience with Python development and database automation/maintenance