

### ATTACHMENT #3

#### Bruce R. Chapman

Mr. Chapman received his Bachelors in Economics from the University of Pittsburgh in 1976 and his Masters in Economics from the University of Wisconsin-Madison in 1979. Mr. Chapman completed all course work necessary for a PhD in Economics from the University of Wisconsin-Madison in 1981.

Mr. Chapman's experience and expertise is evident from his work as outlined in his curriculum vitae which included reviewing cost-of-service methodology for a Canadian utility, directing a cost-of service study for a large distribution utility, assisting a utility in adjusting its costing and pricing methods following addition of assets, creation of customized company cost-of-service models for an Asian utility, and conduct and management of a cost-of service study for a Caribbean utility. Mr. Chapman was a Panelist in the Cost-of-Service Methodology review hearings on behalf of Nova Scotia Power before the Nova Scotia Utilities and Review Board.

Mr. Chapman has also undertaken a wide range of rate design activities, some within traditional design structures. Others have involved innovative time-varying and dynamic designs based on marginal cost, as well as such niche designs as graduated customer charges and fixed billing. Having worked in the energy industry since 1986, Mr. Chapman has accumulated significant experience in costing and pricing under regulation.

As set forth in his CV, Mr. Chapman has published articles in journals such as *Natural Gas and Electricity*, and *The Electricity Journal* and has been requested to present workshops and industry conference presentations on Cost of Service principles and preparation of Cost of Service Studies.

**Manitoba Hydro requests that Mr. Chapman be qualified as an economist with expertise in hydro electric utility regulation with a particular emphasis on cost allocation and rate design and the development, preparation and review of cost of service studies.**

# **Bruce R. Chapman**

## **RESUME**

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### **Academic Background:**

All course work necessary for PhD, University of Wisconsin-Madison, 1981, Economics  
MA, University of Wisconsin-Madison, 1979, Economics  
BA, University of Pittsburgh, 1976, Economics

### **Positions Held:**

Vice President, Christensen Associates Energy Consulting, LLC, 2015-present  
Senior Economist, Christensen Associates Energy Consulting, LLC, 2005-2014  
Senior Economist, Laurits R. Christensen Associates, Inc., 1992-2005  
Economic Analysis Consultant, Laurits R. Christensen Associates, Inc., 1988-1992  
Research Economist, Laurits R. Christensen Associates, Inc., 1986-1988  
Associate Consultant, Coopers & Lybrand Consulting Group, Economics Practice,  
Toronto, Canada, 1985-1986  
Research Assistant, University of Wisconsin-Madison, 1980-1981  
Research Analyst, Woods Gordon (Economics Group), Toronto, Canada, 1979-1980

### **Professional Experience:**

I assist clients in the electricity and natural gas industries to improve their costing and pricing capabilities. I advise clients in such areas of expertise as: cost-of-service analysis and rate design based upon established regulatory and market-based principles; innovative rate design including demand response products, renewables pricing, fixed billing, and other market-based retail pricing products; load forecasting and load research analysis. I supervise and conduct analysis of costing and pricing issues for utilities, regulators, customers and other industry stakeholders. Additionally, I have supervised the development of software required for the implementation and support of innovative retail products. Examples include cost-of service and rate design models to

support rate applications, and models to predict customer tariff choice and price response. I regularly present costing and pricing issues and concepts at industry conferences and workshops.

**Major Projects:**

Reviewed alternative rate designs for a Canadian utility whose costs were subject to significant change in structure.

Reviewed cost-of-service methodology for a Canadian utility whose costs were subject to significant change in structure.

Provided pricing and revenue recovery guidance to a Caribbean utility.

Provided guidance to a Southeast Asian utility in the design of time-of-use rates. Guidance included instruction in simulation of price response.

Directed a cost-of-service study for a large distribution utility.

Assisted a utility to adjust its costing and pricing methods following addition of significant new generation and transmission assets.

Assisted a utility to merge rates of two separate service territories following a corporate merger.

Reviewed a natural gas distribution utility's proposal for a commodity hedging arrangement.

Assisted in developing an electric vehicle tariff for a Midwestern utility.

Assisted in an evaluation of economic development and load retention rates for a Midwestern utility.

Led an evaluation of a Midwest utility's residential time-of-use rate in comparison with other TOU designs and current marginal costs. Evaluated means by which participation could be increased.

Participated in an evaluation of the merits of a special contract for a large customer of an Eastern utility.

Conducted an analysis of the relative cost-of-service implications of creating a separate class for a specialized subset of customers from an existing large customer class.

Assisted a Great Plains utility to develop a renewable tariff for large industrial customers.

Managed a project that assisted a Great Plains public service commission staff to evaluate natural gas utility submissions for safety-related cost recovery via new riders.

Participated in a load research data development project for a Midwestern utility, including sample design and selection, and class interval load profile development.

Conducted an analysis of the cost implications for a Caribbean utility of introducing LED street lighting.

Developed generic cost-of-service and rate design models for use in client rate cases.

Customized company cost-of-service and rate design models for an Asian utility. The project also included support for marginal cost capability development.

Led a rate case preparation process for a Southeastern utility that included load and energy forecasting, development of revenue requirements, and support for cost of service and rate design.

Participated in a Midwest utility's rate case by reviewing current mass market time-of-use and other rate designs and recommending modifications.

Collaborated in a review of a large Canadian utility's cost-of-service methodology, including a public review process with stakeholders. Testified before regulator regarding recommendations.

Conducted an assessment of a Great Plains public power utility's plans for three pricing concepts: green power, economic development rates, and unbundled retail pricing to facilitate customer choice.

Assisted a distribution utility to review aspects of its distribution cost allocation methodologies by conducting a survey of methodologies across a number of electric utilities.

Assisted a state energy office to review ways in which the state could improve its record of energy efficiency program achievements, as recorded by the ACEEE Scorecard.

Collaborated in the development of rate redesign alternatives for a utility's real-time pricing program structure.

Collaborated in the review of the potential for a Canadian utility to introduce a fuel adjustment mechanism.

Conducted an analysis of probable migration of customers to new time-of-use electricity programs offered by a southeastern utility.

Evaluated the accuracy of an electric utility's fixed bill offer algorithm and recommended modifications.

Led a project which conducted a review of an electric utility's avoided cost calculation and the application of those costs in energy efficiency reviews.

Managed and participated in reviews of rate and gas cost adjustment applications for a Great Plains public service commission's gas division.

Conducted a cost-of-service and rate design study for a Caribbean utility in preparation for a rate submission.

Supported review for an industrial customer group of a large filing by a utility, focusing on non-bypassable riders.

Managed a gas cost review process for a Great Plains regulatory agency.

Analysis of smart grid pricing issues for a Great Plains public power utility.

Contributed to load research sample development for an investor-owned utility.

Managed a review of a large electric and gas utility's costing methodologies.

Managed a cost-of-service and rate design study for a Caribbean utility.

Conducted analysis of distribution costing practices at a large Midwestern investor-owned utility.

Development of a time-of-use rider for two electric utilities.

Management of a study of interruptible pricing program improvements for a large Midwestern utility.

Management of a comprehensive cost-of-service and rate design study for a Caribbean utility.

Strategic pricing for a large hydro-dominated utility.

Evaluation of the net economic benefits of alternative power supply strategies: coal vs. renewables and energy efficiency.

Load forecasting project for a medium-sized electric utility with significant industrial load.

Analysis of alternative means of net metering.

Evaluation of alternative demand response programs for a municipal utility.

Analysis of treatment of margins from real-time pricing.

Analysis of a natural gas energy conservation funding mechanism.

Design and pricing of a small customer Time-of-Use program.

Evaluation of cost of capital for a small Caribbean utility.

Risk pricing of a long-term customer choice retail contract.

Evaluation of response by small customers to fixed billing programs.

Evaluation of response by medium-sized customers to a banded fixed billing program.

Cost-of-service project including marginal cost and traditional cost basis.

Preparation of load research survey sample via stratified random sampling.

Design and pricing of a Critical Peak Pricing product

Evaluation of residential customers' propensity to adopt a voluntary Time-of-Use product

Pricing of a fixed bill product for a new service territory based on response elsewhere

Evaluation of peak period response to a fixed billing product

Development of an electric utility fuel forecast

Customization of fixed bill software for use at a utility site

Design and pricing of a Banded Fixed Billing product.

Long-term wholesale power procurement for an electric utility.  
Report on Adoption of Variable Pricing contracts in deregulated retail electricity markets.  
Development of Fixed Bill software to generate offers and monitor customer behavior.  
Quantitative evaluation of net benefits of demand response programs.  
Quantitative evaluations of customer response to fixed billing.  
Design and pricing of several pilot and permanent fixed-bill programs.  
Development of Efficient Tariff Prices via Marginal Costing.  
Analysis of Market Data Available to Estimate Marginal Cost of Reliability.  
Evaluation of Risk of Fixed Billing Based on Customer Response.  
Cost Allocation Analysis for Rate Case Filing.  
Analysis of Customer Response to Fixed Billing.  
Fixed Bill Scoping for a Natural Gas Provider.  
Analysis of Risk Implications of Fixed Billing for an Electric Utility.  
Strategic Assessment of an Electric Utility's Retail Tariff Portfolio.  
Guaranteed Bill Product Design and Risk Assessment.  
White Paper on Interruptible/Curtailable Service.  
Marginal Cost-Based Cost of Service Development.  
Software Scoping for Self-Designed Products.  
Flat Bill Offer Software Development.  
Comprehensive Rate Repricing.  
RTP Price Hedging Product Development.  
Retail Pricing Under Competition Conference.  
Rate Optimization Plan.  
Fixed Bill Product Development.  
Weather Hedge Evaluation.  
Real-Time Pricing Product Development.  
Workshop: Creating a Diversified Retail Pricing Portfolio.  
Product Mix Business Plan.  
Prepared material for testimony in Federal District Court on Real-Time Pricing.  
Risk-Based Pricing Workshops.  
Survey of New Electricity Market Players.

Analysis of Fixed Bill Products.

Strategic Pricing Plan for a Midwestern Utility.

Product Mix Analysis for Small Customers.

Real-Time Pricing Workshop.

Innovative Pricing and Marginal Costing for a Co-op.

Real-Time Pricing with Multiple Options.

Real-Time Pricing for a G&T and its Co-ops.

Product Mix Analysis for Large Customers.

Real-Time Pricing Service Design for Commercial Customers.

Advanced Service Design Workshop.

Real-Time Pricing Program for a Midwestern Utility.

Evaluation of Customer Response to Real-Time Pricing.

Real-Time Pricing Program Development for an Eastern Utility.

Two-Part Pricing Service Design.

Real-Time Pricing Regional Workshops.

Real-Time Billing Program Support and Revision.

Electricity Efficiency Programs.

Real-Time Pricing Program Redesign for an Eastern Utility.

Real-Time Pricing Implementation for a Canadian Utility.

Real-Time Pricing Practitioners' Workshop.

Real-Time Pricing for a Canadian Utility.

Customer Evaluation of Real-Time Pricing.

Review of Competitive Pricing Strategies.

Evaluation of Process of Marketing Real-Time Pricing.

Review of Methods for Distinguishing Customer Response to Rate Change.

Real-Time Pricing Rate for a Southern Utility.

Review of Accounting and Incentives for a Real-Time Pricing Rate.

Analysis of Load Impact of Priority Service Alternatives.

Benefit/Cost Analysis of an Integrated Energy Management System.

Benefit/Cost Analysis of Marginal Cost-Based Rates for DSM Integrated Resource Plan.

Impact Evaluation of Curtailable Electric Service.

Survey of Households Who Were Candidates for Voluntary Time of Use Rates.

Audit of Energy Management Software.

Real-Time Pricing Rate for a Large Northeastern Public Utility.

Software Design for Real-Time Pricing.

Improved Approaches to Estimating Benefits of DSM Programs.

Load Shapes Assessment Program.

Fuel Purchase Contract Study.

Evaluation of the Effects of Canadian Energy Policy.

Evaluation of Energy Conservation Programs.

**Professional Papers:**

“Pricing of Renewable Energy Made Difficult by Policy Challenges”, *Natural Gas & Electricity*, January 2016.

“Hedging Exposure to Volatile Retail Electricity Prices”, *The Electricity Journal*, June 2001 (with Ahmad Faruqui, Dan Hansen, and Chris Holmes).

“A Survey of Real-Time Pricing Programs”, *The Electricity Journal*, August–September 1993 (with Juliet Mak).

“Real-Time Pricing: DSM at Its Best?”, *The Electricity Journal*, August 1990 (with Tom Tramutola).

**Conference Presentations:**

“Pricing the Purchase of Renewable Energy,” post-conference workshop at EUCI’s 4<sup>th</sup> Annual Southeast Clean Power Summit, March 2015.

“Pricing Perspectives of Regulated Utilities on Solar Power,” EUCI’s Net Metering 2.0 and Utility Solar Rates Conference, Anaheim, CA, January 2015.

Cost of Service and Rate Design; Current Utility Costing and Pricing Challenges; Pricing Renewable Energy; Feed-in Tariffs and Demand Response Alternatives to Supply. Presentations to the Wisconsin Public Utility Institute’s Energy Utility Basics Course, 2009–2015.

“The Bill Please,” university course and public presentation within the “Decoding the Energy Industry” series; Wisconsin Public Utility Institute, 2014.

Electric Rate Design Principles and Designs (with Dr. Stephen Braithwait), and Pricing Renewable Resources; presentations to the Rate Design and Regulation Workshop, Wisconsin Public Utility Institute, Madison, Wisconsin, 2014.

“Customer Response to Dynamic Pricing: Who Responds and How?,” EUCI’s Smart Ratemaking Conference, Oct. 2009, Los Angeles; with Dr. Steven Braithwait.



Cost-of-Service, preconference workshop, EUCI's Smart Ratemaking Conference, Oct. 2009, Los Angeles.

Critical Peak Pricing: Valuation and Viability, presented at AESP's Innovations in Retail Pricing Conference, Chicago, IL, May 17, 2006.

Georgia Power's FlatBill Program, Risks and Returns, presented, with Monamee Adhikari, Georgia Power Company, at AESP's Innovations in Retail Pricing Conference, Chicago, IL, May 17, 2006.

Retail Pricing for Competitive Power Markets, six presentations on retail pricing and unbundling; Infocast conference February 28-March 2, 2001.

Retail Products and Pricing Under Competition, presented at the Canadian Electricity Association's seminar: Setting Up for New Energy Regulation, April 19, 1999.

Using Risk as the Maker of Prices: Risk-Based Pricing, presented at Infocast's conference: Power Industry Retail Pricing, June 23-25, 1999.

"Designing a Retail Pricing Product Mix for a Competitive Market: A C-VALU Case Study," presented at EPRI's Innovative Pricing Conference, Washington, DC, June 18, 1998, (with Kathleen King and David Kulha).

"Retail Products & Pricing in the Competitive Era," presented at IBC Conference: Successfully Implementing Retail Access, Washington, DC, April 27, 1998.

"Risk-Based Pricing: Making Money in Competitive Markets," EMACS Conference, Atlanta, Georgia, October 14, 1997, (with A. Faruqi, EPRI).

"Real-Time Pricing: Becoming Competitive Before Competition," presented at IBC Conference: Successfully Implementing Retail Profit Projects, Atlanta, Georgia, February 24, 1997, and Las Vegas, Nevada, July 17, 1997.

"Effective Retail Product Design for a Competitive Market," IBC Conference: Developing, Negotiating and Contracting Retail Electricity Prices, Atlanta, Georgia, February 24, 1997, (with Kathleen King).

"Innovative Pricing and Data Requirements," presented at the AEIC Load Research Conference, Washington, DC, August 4-6, 1995.

"Lessons Learned and the Path Forward," presented at EPRI's National Conference on Achieving Success in Evolving Electricity Markets, Atlanta, Georgia, October 10-12, 1995 (with Kathleen King).

"A Real-Time Pricing Primer: Service Design for a Competitive Market," presented at the Missouri Valley Electric Association Marketing Division Conference, Kansas City, Missouri, October 13, 1994.

"Real-Time Pricing: Service Design for a Competitive Market," presented at the American Public Power Association workshop, Scottsdale, Arizona, September 28, 1994.

“Customer Response to Real-Time Pricing: Results from Current Experiments,” presented at the 6th National Demand-Side Management Conference, Miami Beach, Florida, March 25, 1993.

“Electricity Pricing Innovations for Retail Sales,” presented at the Energy Utilities and Regulation Course, Wisconsin Public Utilities Institute, September 13, 1990; revised and presented again in 1992.

“Innovative Pricing in DSM: Recent Field Tests of Real-Time Pricing,” presented at the Energy Demand-Side Research Seminar Series, University of Wisconsin-Madison, April 4, 1990 (with D. W. Caves).

**Testimony:**

Panelist in Cost-of-Service Methodology review hearings on behalf of Nova Scotia Power, before the Nova Scotia Utilities and Review Board, proceeding NSUARB-NSPI-P-892, Matter No. M05473, December 2013.