

AGUSTIN J. ROS
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Dr. Agustin J. Ros is a Principal of the Brattle Group whose expertise is in public utility economics and antitrust in network industries—airlines, energy, postal, telecommunications and water—and is an Adjunct Professor at the International Business School at Brandeis University where he teaches a course on public utilities and antitrust economics. He has more than 20 years of consulting and agency experience and specializes in cost of service and performance-based ratemaking, competition and market power in network industries, damages, and econometric modelling. He teaches at the annual Edison Electric Institute (“EEI”) Advanced Rate Course in Madison, Wisconsin on embedded and marginal cost of service as well as efficient rate design principles and practices. At the EEI Electric Rate Course he has taught industry professionals all aspects of embedded cost of service including the theory and practice of functionalization, classification, allocation and rate design.

Dr. Ros worked at the Illinois Commerce Commission where he reviewed dozens of cost of service studies and advised the Chairman on all matters before the Commission. His consulting and research interest includes examining the workings of retail electricity competition and his econometric and statistical investigation of competition in retail and wholesale electricity markets in the U.S. was recently published in the *Energy Journal*. In addition, he has published his research in the *Journal of Regulatory Economics*, *Review of Industrial Organization*, *Review of Network Economics*, *Telecommunications Policy* and *Info*.

AREAS OF EXPERTISE

- Cost of Service, Demand and Pricing in Network Industries
- Regulated Industry Policy and Restructuring
- Competition and Performance Based Ratemaking

EDUCATION

Ph.D. Economics, University of Illinois-Urbana Champaign	1994
M.S. Economics, University of Illinois-Urbana Champaign	1991
B.A. Economics, Rutgers University-Newark	1989

TEACHING POSITIONS

Brandeis University, International Business School, <i>Adjunct Professor</i>	2016-present
University of Anahuac, Mexico City, <i>Guest Lecturer</i>	2010
Northeastern University, <i>Adjunct Instructor</i>	2000

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EXPERT REPORTS, TESTIMONY AND AFFIDAVITS

Testimony before the State of New Hampshire Public Utilities Commission, Docket No. DE 19-064, on behalf of the Staff of the New Hampshire Public Utility Commission on marginal cost of service studies, December 6, 2019.

Expert report on behalf of the Newfoundland and Labrador Board of Commissioners of Public Utilities: Review of Existing and Proposed Network Additions Policies for Newfoundland and Labrador Hydro, with Philip Hanser and Peal Donohoo-Vallet, November 19, 2019.

Expert report on behalf of Bragg Communications Inc. (c.o.b. Eastlink), Cogeco Communications Inc., Rogers Communications Canada Inc., Shaw Cablesystems G.P., and Videotron Ltd., Analysis of CRTC's Final Rates for Aggregated Wholesale High-Speed Access Services: Impact on Broadband Network Investment and Innovation, with Renée M. Duplantis, Dimitri Dimitropoulos and Ian Cass, November 13, 2019.

Testimony before the Virginia Corporation Commission, Case No. PUR-2019-00104, on behalf of the Virginia Electric Power Company on cost allocation of utility scale solar projects, July 1, 2019.

Expert report on behalf of the Newfoundland and Labrador Board of Commissioners of Public Utilities: Embedded and Marginal Cost of Service Review, with Phil Hanser, T. Bruce Tschusida, Pearl Donohoo-Vallet, and Lynn Zang, May 3, 2019.

Expert report on behalf of Shaw Communications before the Canadian Legislative Review Panel of the Broadcasting and Telecommunications: Analysis of BDU Contributions, ISP Taxes and Regulations in the Canadian Broadcasting and Telecommunications Industries: Economic Efficiency, Investment and Innovation, with Coleman Bazelon and Renée Duplantis, January 11, 2019.

Expert opinion on behalf of CFE International LLC before the U.S. Citizenship and Immigration Services and Department of Homeland Security: An Overview of the Mexican Energy Markets and Reforms, October 25, 2018.

Expert report on behalf of Shaw Communications before the Canadian Competition Bureau: An Analysis of Broadband Services in Canada, Competition, Regulation and Investment with Coleman Bazelon and Renée Duplantis, August 30, 2018.

Affidavit on behalf of CFE International LLC before the Federal Energy Regulatory Commission: market-based rate authority application on vertical and horizontal market power issues in U.S. electricity markets, with Judy Chang, June 13, 2018.

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Expert report on behalf of the Australian Competition and Consumer Commission (ACCC), before the ACCC: International experiences in retail electricity markets, with Toby Brown, Neil Lessem, Serena Hesmondhalgh, James D. Reitzes and Haruna Fujita, June 2018

Expert report on behalf of Transportadora de Gas Natural de la Huasteca, S. de R.I. de C.V. before the Mexican Energy Regulatory Commission: expert opinion on issues related to the appropriate allowed rate of return for the TGNH pipeline, with Paul Carpenter and Bente Villadsen, May 23, 2018.

Expert report on behalf of Infraestructura Marina del Golfo, before the Mexican Energy Regulatory Commission: expert opinion on issues related to the appropriate allowed rate of return for the IMG pipeline, with Paul Carpenter and Bente Villadsen, May 23, 2018.

Expert report on behalf of GCI Communications before the Federal Communications Commission: rate of return, cost of service and cross-subsidy analysis of GCI's Satellite-Based Services, with William Zarakas and Nicolas E. Powers, May 2018.

Expert report on behalf of GCI Communications before the Federal Communications Commission, In the Matter of Connect America Fund and Universal Service Reform, WC Docket No. 10-90 and WT Docket No. 10-208A: analysis of the FCC's Rural Health Care Program Funding and Recipients, with William Zarakas, David Kwok, and M. Elaine Cunha, September 2017.

Expert report on behalf of Teléfonos de Mexico before the Mexican Telecommunications Authority: measurement of total factor productivity for Teléfonos de Mexico, July, 2014.

Expert report on behalf of Citibank, before the Honduran Competition Commission: expert report on the competitive effects of the FICHOSA – Citibank merger, April, 2014.

Expert report on behalf of America Móvil before the Mexican Competition Commission: correcting the OECD's erroneous assessment of competition in the Mexican telecommunications sector, May 2013. With Professor Jerry A. Hausman.

Expert report on behalf of Leyde and LACTHOSA before the Honduran Competition Commission: expert report on the competitive effects of a joint venture between Leyde and LACTHOSA in the Honduran dairy sector, April 2013.

Expert report on behalf of Lowe's Mexico before the Mexican Competition Commission: economic analysis on market definition, market power and monopolistic practices in the market for home improvement products sold through superstores, October 2012.

Expert report on behalf of Comcel before the Regulatory Commission of Communications in Colombia: expert report on economic analysis of Resolution CRC 3139 2011 regarding on-net and off-net pricing and termination rates, November 9, 2011.

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Expert report on behalf of ESSOSA and Puma before the El Salvador Competition Commission: expert report on the competition implications of assets sales in El Salvador, (with Ramsey Shehadeh) October 5, 2011.

Expert report on behalf of ESSOSA and Puma before the Honduran Commission for the Defense and Promotion of Competition: expert report on the competition implications of assets sales in Honduras, (with Ramsey Shehadeh) July 19, 2011.

Testimony before the state of Illinois on behalf of Northern Illinois Gas Company, Docket No. 11-0046, surrebuttal testimony regarding market definition, market power and public interest considerations, filed April 22, 2011.

Testimony before the Alberta Public Utility Commission, Proceeding 566 Electricity Rate Regulation Initiative, update, reply and PBR review study, filed February 22, 2011.

Testimony before the Alberta Public Utility Commission, Proceeding 566 Electricity Rate Regulation Initiative, total factor productivity study, filed December 30, 2010.

Testimony before the state of Illinois on behalf of Northern Illinois Gas Company, Docket No. 09-0310, rebuttal testimony regarding market definition, market power and public interest considerations, filed August 6, 2010.

Expert report before the Commission for the Supervision of Business Competition of the Republic of Indonesia on behalf of Singapore Telecommunications Limited and Singapore Telecom Mobile, "Competitive Assessment of the Indonesian Mobile Sector," (with William E. Taylor, Nigel Attenborough and Christian Dippon), filed October 15, 2007, rebuttal report filed January 11, 2008.

Expert report before the Ministry of Economic Affairs and Development on behalf of Cable and Wireless Barbados, "An Economic Assessment of Mandating Indirect Access in Barbados," (with Michael Khyefets and Loren Adler), November 14, 2007.

Expert report before the Supervising Agency for Private Investment in Telecommunications in Peru (OSITPEL) on behalf of Telefonica de Peru, expert report on economic efficiency considerations with respect to termination rates and the impact of capacity-based charges, (with Jose Maria Rodriguez), filed October 17, 2007.

Expert report before the Canadian Radio and Telecommunications Commission (Telecom Public Notice CRTC 2006-14) on behalf of Bell Aliant Regional Communications, "Telecommunications Competition in the US: An Assessment of Wholesale Regulation Policy," (with William E. Taylor), filed March 15, 2007.

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Expert report before the New York Public Service Commission (Case 06-C-0897) on behalf of Verizon New York, “Report on Competition for Retail Business Services,” (with William E. Taylor and Harold Ware), filed report August 31, 2006. Supplemental Report filed October 2, 2006.

Expert report before the Telecommunications Authority of Trinidad and Tobago on behalf of Telecommunications Services of Trinidad and Tobago, response to Digicel’s economic analysis of Interconnections costs and rates, filed May 12, 2006 (with Timothy Tardiff).

Expert report before the Telecommunications Authority of Trinidad and Tobago on behalf of Telecommunications Services of Trinidad and Tobago, expert report on interconnections costs in Trinidad and Tobago, filed May 4, 2006 (with Timothy Tardiff).

Expert report before the Telecommunications Authority of Trinidad and Tobago on behalf of Telecommunications Services of Trinidad and Tobago, expert report on Benchmark Mobile Termination Rates, Evaluation of the .Econ Report, filed February 10, 2006 (with Timothy Tardiff).

Expert report before the Supervising Agency for Private Investment in Telecommunications in Peru (OSITPEL) on behalf of Telefonica de Peru, expert report on OSITPEL’s imputation methodology, filed February 7, 2006 (with Jose Maria Rodriguez and Eduardo Prieto Kessler).

Expert report before the Comisión Federal de Telecomunicaciones de México, on behalf of Telcel, S.A., expert report measuring the cost Telcel incurs when providing interconnection services to operators, filed 22 June 2005.

Expert report before the Supervising Agency for Private Investment in Telecommunications in Peru (OSITPEL) on behalf of Telefonica de Peru, final report regarding the estimation of Telefonica de Peru’s total factor productivity for application in the 2004-2007 price cap regime (with José María Rodríguez Ovejero and Juan Hernández García), 21 June 2004.

Expert report before the Bahamas Public Utilities Commission, on behalf of the Bahamas Telecommunications Company, “Public Consultation on the Universal Service Obligation in The Bahamas,” Comments filed 24 March 2004; Reply Comments filed 10 June 2004.

Expert report before the Canadian Radio-television and Telecommunications Commission on behalf of Aliant Telecom Inc., Bell Canada, MTS Communications Inc., Saskatchewan Telecommunications and Télébec, société en commandite, Public Notice 2003-10, “A Review of Rules and Regulations Governing Bundled Telecommunications Services.” filed 12 March 2004, updated report filed 26 March 2004.

Expert report before the Bahamas Public Utilities Commission, on behalf of the Bahamas Telecommunications Company, “Public Consultation on Price Control of Bahamas Telecommunications Company,” 19 September 2003.

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Expert report before the Comisión Federal de Telecomunicaciones de México, on behalf of the Commission, “Telmex’s 2003-2006 Price Cap Tariff Proposal,” expert report in arbitration regarding the renewal of the price cap plan for Telmex (with William Taylor, Georgina Martinez, and Aniruddha Banerjee), 13 December 2002.

Expert report before the Honorable Arbitration Tribunal of Fairness in Guatemala, Case No. CENAC-A-01-2002, final report in arbitration regarding call termination costs in fixed and wireless networks (with José María Rodríguez Ovejero, Laurent Bensancon, and Juan Hernández García), September 2002.

Expert report before the Federal Communications Commission on behalf of BellSouth Corporation Docket Nos. 01-338, 96-98, 98-47 Reply Declaration (with William Taylor, Aniruddha Banerjee, and Charles Zarkadas) regarding unbundling obligations of local exchange carriers. Filed 17 July 2002.

Expert report before the Federal Communications Commission on behalf of Verizon Communications, Docket Nos. 01-339, 01-337, 02-33, Statement of 43 Economists on the Proper Regulatory Treatment of Broadband Internet Access Service, 3 May 2002.

Expert report before the New Zealand Commerce Commission on behalf of Telecom New Zealand, “Review of CostQuests’ Associates Benchmarking Survey” (with William Taylor, Greg Houston, Tom Hird, Jaime D’Almeida, and Carol Osborne), May 2002.

Testimony before the State of Illinois on behalf of Verizon North Inc. and Verizon South Inc., Docket No. 98-0195, surrebuttal testimony regarding investigation into certain payphone issues as directed in Docket 97-0225, 16 July 2001.

Expert report before the Supervising Agency for Private Investment in Telecommunications in Peru (OSIPTEL) on behalf of Telefonica de Peru, final report regarding the estimation of Telefonica de Peru’s total factor productivity for application in the 2001-2003 price cap regime (with Timothy Tardiff, José María Rodríguez Ovejero, and Juan Hernández García), 22 June 2001.

Testimony before the State of Illinois on behalf of Verizon North Inc. and Verizon South Inc., Docket No. 98-0195, rebuttal testimony regarding investigation into certain payphone issues as directed in Docket 97-0225, 20 April 2001.

Expert report before the New Zealand Commerce Commission, on behalf of Telecom New Zealand, “Costs of Telecommunications Competition Policies,” final report exploring the indirect economic costs of changing competition policy to a more regulatory approach (with Harold Ware, Timothy Tardiff, and Nigel Attenborough), May 2000.

Testimony before the State of Illinois on behalf of GTE North Incorporated and GTE South Incorporated, Docket No. 98-0195, direct testimony regarding investigation into certain payphone issues as directed in Docket No. 97-0225, 21 December 1999.

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Expert report before the Federal Communications Commission on behalf of US West, An Economic and Policy Analysis of Efficient Inter-Carrier Compensation Mechanisms for ISP-Bound Traffic, 12 November 1999.

Expert report before the Pennsylvania Public Utility Commission on behalf of Bell Atlantic Pennsylvania, Promised Fulfilled: Bell Atlantic-Pennsylvania's Infrastructure Development (with William Taylor, Charles Zarkadas, and Jaime D'Almeida), 15 January 1999.

Testimony before the State of Illinois on behalf of Illinois Gas Transmission Company, Docket No 98-0510, rebuttal testimony regarding certification of Illinois Gas Transmission Company as a Common Carrier by Pipeline and approval of rates and accounting, and for cancellation of the Certificate of Illini Carrier, LP, 11 January 1999.

Expert report before the Spanish Regulatory Commission on behalf of Telefónica, final report "Assessment of the methodology used by Telefónica in the calculation of the prices included in the interconnection reference offer and comparison with BT's interconnection prices" (with Nigel Attenborough, David Robinson, Yogesh Sharma, and José María Rodríguez Ovejero), October 1998.

Expert report before the Italian Regulatory Commission on behalf of Telecom Italia, final report "Volume Discounts: A Report for Telecom Italia" (with Nigel Attenborough, Andrea Coscelli, and Andrea Lofaro), October 1998.

Expert report before the Federal Communications Commission on behalf of Bell Atlantic, Docket Nos. 96-262, 94-1, 91-213, 96-263, "An Analysis of the Effects of Exchange Access Reform on Demand Stimulation" (with Charles Zarkadas), 27 April 1997.

RECENT CONSULTING ENGAGEMENTS

Consulting work on behalf of a major electricity distribution company in the U.S.: cost study and competitive pricing principles of advanced metering services. 2018.

Consulting work on behalf of a Canadian electricity provider: benchmarking analysis of generation utilities in transmission and regulatory practices with respect to generation procurement practices, distributed energy resources and customer-specific pricing practices, 2018.

Consulting work on behalf of a U.S. generation and transmission electricity cooperative: embedded and marginal cost of service studies to support rate reform initiative, 2018.

Consulting work on behalf of a major electricity distribution provider in the U.S.: develop a locational distribution marginal cost-based cost of service study to support the value of distributed energy resource proceedings, 2017 - 2018.

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Consulting report on behalf of major foreign electricity and gas distribution company: Rules and regulations applicable to the competitive U.S. retail electricity providers in the U.S. and Canada: A regulatory assessment. November 2017.

Consulting report on behalf of major foreign electricity and gas distribution company: Rules and regulations applicable to the competitive U.S. retail natural gas providers in the U.S. and Canada: A regulatory assessment. November 2017.

Consulting work on behalf of the Cities of Garland, Mesquite, Plano, and Richardson appealing the decision by North Texas Municipal Water District affecting wholesale water rates, Texas PUC Docket No. 46662 and SOAH Docket No. 473-17-4964.WS: economic analysis of whether wholesale water rate charged by the District adversely affects the public interest and rate design issues.

Consulting work on behalf of a major electricity distribution company in the U.S.: cost study and competitive pricing principles of advanced metering services. 2015 - 2016.

Consulting report for the Mexican National Center for the Control of Natural Gas: Electricity demand forecast for the National Mexican Electricity System for the period 2017-2030. December 2016. With Veronica Irastorza and Elvira Creel.

Consulting report for the Mexican Secretariat of Communications and Transport: “Econometric demand study of fixed and mobile broadband and telephony services and Pay-TV services using discrete choice analysis.” January 2016. With Kenneth Train and Douglas Umaña.

Consulting report for the Mexican Secretariat of Energy, CFE horizontal generation split analysis: recommended number of CFE gencos. September 2015. With Hamish Fraser and Willis Geffert.

Consulting report for the Mexican Secretariat of Energy, CFE horizontal generation split analysis: Recommended optimal portfolio mix for the CFE gencos. September 2015. With Hamish Fraser and Willis Geffert.

Consulting report for the Mexican Secretariat of Energy, CFE horizontal generation split analysis: Identification of relevant markets within the Mexican wholesale electricity markets. August 2015. With Hamish Fraser and Willis Geffert.

Consulting report for the Mexican Secretariat of Energy: Vesting contract criteria and methodology report. July 2015. With Hamish Fraser, Gene Meehan and Kurt Strunk.

RECENT PRESENTATIONS

Presentation before Rutgers University’s Center for Research in Regulated Industries, Advanced Workshop: “Residential Electricity Competition at a Crossroads,” January 2019.

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Presentation before the EEI Electric Rates Advanced Course, “Introduction to Embedded Cost of Service,” with Phil Q Hanser, July 2018.

Presentation before the EEI Electric Rates Advanced Course, “Introduction to Marginal Cost of Service,” with Phil Q Hanser, July 2018.

Presentation before the Public Collaborative for the Puerto Rico Electricity System, “Introduction to Utility Regulation,” with Karl McDermott, July 19, 2018.

Presentations before the Public Collaborative for the Puerto Rico Electricity System, “Introduction to Electricity System Planning,” with Karl McDermott, July 19, 2018.

Presentation before the Public Collaborative for the Puerto Rico Electricity System, “Ownership Structure, Contracting Process and Wholesale Markets,” with Karl McDermott, July 19, 2018.

Presentation before Rutgers University Center for Research in Regulated Industries Eastern Conference: “Marginal cost of service: electricity distribution locational marginal costs, with Phillip Q Hanser and T. Bruce Tsuchida, June 8, 2018.

Presentation before the World Forum on Energy Regulation, Cancun Mexico: “Rate design helping facilitate change in electricity markets,” March 2018.

Presentation before Rutgers University’s Center for Research in Regulated Industries, Advanced Workshop: “Utility of the future and cost of service: challenges and opportunities,” January 2018.

Presentation before Rutgers University’s Center for Research in Regulated Industries, 36th Annual Eastern Conference: “The evolving electricity distribution network – technological, competitive and regulatory implications.” May 2017.

Presentation before Rutgers University’s Center for Research in Regulated Industries, Advanced Workshop: “Costing and pricing of electricity smart grid service offerings and competitive implications.” January 2017.

Presentation before Rutgers University’s Center for Research in Regulated Industries, 35th Annual Eastern Conference: “Determinants of total factor productivity in the U.S. electricity sector and the effects of performance-based regulation.” May 2016.

Presentation before Rutgers University’s Center for Research in Regulated Industries, Advanced Workshop: “merger theory and practice in the U.S. electricity sector.” January 2016.

PUBLICATIONS

“Economic framework for compensating distributed energy resources: Theory and practice.” (with Romkaew Broehm and Philip Hanser), *The Electricity Journal* 31(8): 14-22 (2018).

“The future of the electric grid and its regulation: Some considerations,” *The Electricity Journal* 31(2): 18-25 (2018).

“An Econometric Assessment of Electricity Demand in the United States using Utility-Specific Panel Data and the Impact of Retail Competition on Prices.” *The Energy Journal* 38(4): 73-99 (2017).

“An Econometric Assessment of Telecommunications Prices and Consumer Surplus in Mexico using Panel Data.” (with Jerry A. Hausman), *Journal of Regulatory Economics*, vol. 43:284-304 (2013).

“Corrección de la Evaluación Errónea de la OCDE Acerca de la Competencia en el Sector de las telecomunicaciones en México.” (con Jerry Hausman), *El Trimestre Económico* (2013).

“The Impact of Asymmetric Mobile Regulation in Colombia.” (with Douglas Umana), *Info*, vol. 15 No. 3:54-65 (2013).

“Correcting the OECD’s Erroneous Assessment of Telecommunications Competition in Mexico.” (with Jerry A. Hausman), *CPI Antitrust Chronicle* June 2012.

“North American Performance-Based Regulation for the 21st Century.” (with Jeff D. Makholm and Stephen Collins), *Electricity Journal* vol. 25, Issue 4, May 2012.

“The Determinants of Pricing in the Mexican Domestic Airline Sector: The Impact of Competition and Airport Congestion.” *Review of Industrial Organization* vol. 38:1 (2011), pp 43-60.

“Anticipating Merger Guidelines from Mexico’s Commission on Competition.” (with Elizabeth M. Bailey), *International Antitrust Bulletin* vol. 4, (2010).

“X-factor Updating and Total Factor Productivity Growth: The Case of Peruvian Telecommunications, 1996-2003.” (with Jeffrey I. Bernstein, Juan Hernandez and Jose Maria Rodriguez), *Journal of Regulatory Economics*, vol. 30:3 (2006), pp 316-342.

“Crecimiento de la demanda por servicios de comunicación móviles. Mitos y realidades (International Mobile Demand Growth: Myths and Reality)” (with Aniruddha Banerjee), *AHCIET Móvil* (September 2005).

“Concepto de costes básicos para la modelización entelecomunicaciones (Basic Economic Cost Concepts for Telecommunications Cost Modeling), Perspectivas en Telecomunicaciones (Perspectives in Telecommunications) (July 2005).

“Drivers of Demand Growth for Mobile Telecommunications Services: Evidence from International Panel Data.” (with Aniruddha Banerjee), in *Global Economy and Digital Society*, Elsevier (2004).

“Patterns in Global Fixed and Mobile Telecommunications Development: A Cluster Analysis.” (with Aniruddha Banerjee), *Telecommunications Policy*, vol. 28 (2004), pp. 107-132.

“The Impact of the Regulatory Process and Price Cap Regulation in Latin American Telecommunications Markets.” *Review of Network Economics*, vol. 2 (2003), pp. 270-286.

“Does Employee Ownership Motivate Workers? Worker Effort, Shirking and Horizontal Monitoring in ESOP.” The Determinants of the Incidence and the Effects of Participatory Organizations, *Advances in the Economic Analysis of Participatory and Labor Management*, edited by Takao Kato and Jeffrey Pliskin, Elsevier Science, vol. 7 (2003).

“The Internet: Market Characteristics and Regulatory Conundrums.” (with Aniruddha Banerjee), *Forecasting the Internet: Understanding the Explosive Growth of Data Communications*, edited by David G. Loomis and Lester D. Taylor, Kluwer Academic Publishers (2002), pp. 187-216.

Profits for All? The Costs and Benefits of Employee Ownership, Nova Science Publishers, (2001).

“Are Residential Local Exchange Prices Too Low? Drivers to Competition in the Local Exchange Market and the Impact of Inefficient Prices.” (with Karl McDermott), in *Expanding Competition in Regulated Industries*, edited by Michael Crew, Kluwer Academic Publishers (2000), pp. 149-168.

“Telecommunications Privatization and Tariff Rebalancing: Evidence from Latin America.” (with Aniruddha Banerjee), *Telecommunications Policy*, vol. 24 (2000), 233-252.

“Utility Regulation in Latin America.” (with Leonardo Giacchino, Cesar Herrera, Siôn Jones, Phillip Maggs, and Kristina Sepetys), *Privatisation International*, edited by Mark Baker, vol. 2 (2000).

“Essential Facilities, Economic Efficiency, and a Mandate to Share: A Policy Primer.” (with Karl McDermott, Kenneth Gordon, and William Taylor), Edison Electric Institute (January 2000).

“Does Ownership or Competition Matter? The Effects of Telecommunications Reform on Network Expansion and Efficiency.” *Journal of Regulatory Economics*, vol.15 (1999), pp. 65-92.

“Telecommunication Restructuring in Brazil: Issues and Options (A Report Based on the Proceedings of the U.S./Brazil Aspen Global Forum).” International Center for Public Administration and Policy Institute for Policy Research and Implementation, Graduate School of Public Affairs, University of Colorado at Denver (December 1997).

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“When, Where and How? Implementing Effective Telecommunications Competition & Regulatory Policy.” *Journal of Project Finance* (Winter 1997).

“Telecommunications in Brazil: Restructuring and Privatization” (et. al.), A Report Based on the Proceedings of the Brazil/U.S. Aspen Global Forum, International Center for Public Administration and Policy Institute for Policy Research and Implementation, Graduate School of Public Affairs, University of Colorado at Denver, August (1997).

“Another Look at What’s Driving Utility Stock Prices.” (with John L. Damagalski and Philip R. O’Connor), *Public Utilities Fortnightly* (January 1997).

"Regulatory Change and the Dismantling of the Bottleneck." Tenth NARUC Biennial Regulatory Information Proceedings (October 1996).

"Stranded Costs: Is the Market Paying Attention? A Look at Market-to-Book Ratios." (with John L. Damagalski and Philip R. O'Connor), *Public Utilities Fortnightly* (May 1996).

"The Gas Storage Market: What Does it Tell Us?" (with Ruth Kretschmer), *Public Utilities Fortnightly* (April 1996).

"Incentive Ratemaking in Illinois: The Transition to Competitive Markets" (with Terry S. Harvill), *Public Utilities Fortnightly* (July 1995).

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 19-057

Date Request Received: 10/11/2019

Date of Response: 10/25/2019

Request No. STAFF 14-002

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Request from: New Hampshire Public Utilities Commission Staff

Witness: Edward A. Davis, Amparo Nieto

Request:

Reference Amparo Nieto testimony. Provide the annual marginal cost based revenue requirement by cost center (i.e., bulk station, non-bulk station, primary trunk, local distribution, and customer cost) for a customer using the design demand and average usage. Provide this example in a live Excel format.

Response:

Please see Attachment Staff 14-002 for the Marginal Cost-of-Service Study by component.

MCOS-BASED REVENUE BY CLASS

TEST YEAR 2018
(\$ Thousands)

BREAKDOWN OF MCOSS BY COMPONENT	6/30/2018	R PL+TOD	R LCS	RWH	GPL+TOD	G SH	G LCS	G-WH	GV	LG	RATE B	OL	EOL
	TOTAL RETAIL												
Bulk distribution stations	4,305.52	1,634.69	19.1	56.4	993.5	2.0	2.6	2.3	955.7	631.5	7.6	0.1	0.1
Distribution non-bulk substations	\$183	97.9	1.1	3.4	59.5	0.1	0.2	0.1	17.2	3.2	0.3	0.0	0.1
Distribution Primary feeder	\$0	-	-	-	-	-	-	-	-	-	-	-	-
Local distribution facilities (Transf. & local conductors)	\$120,938	89,018.0	161.9	624.8	30,932.2	28.5	16.1	13.4	-	-	-	78.2	65.0
Customer MC	\$121,796	78,849.9	104.5	902.3	18,011.9	22.7	5.8	26.6	20,563.5	1,583.8	9.4	1,594.0	121.7
Total MCOS Results by Rate Class (before reconciling)	247,222.70	169,600.5	286.7	1,586.8	49,997.0	53.2	24.7	42.5	21,536.4	2,218.5	17.2	1,672.3	186.8

Note: Calculated using hourly kWh by Class times Hourly Marginal Costs (distribution bulk and non-bulk substations) and with design demand (Dis Facilities)

	R PL+TOD	R LCS	RWH	GPL+TOD	G SH	G LCS	G-WH	GV	LG	RATE B	OL	EOL
Annual Class kWh used in computation of Bulk, and Non Bulk Sub MC	3,144,970,835	36,776,885	92,916,119	1,716,678,138	5,451,861	4,509,879	3,379,300	1,665,675,827	1,135,836,018	18,134,626	17,848,655	12,455,893
Design kW used in computation of Distribution Facilities Cost	11.63	2.54	0.83	21.28	4.06	4.77	0.63	-	-	-	4.46	3.71
Average Marginal Cost (cent/kWh) by Cost Center												
Bulk distribution stations	0.0519779	0.0519779	0.0606959	0.0578742	0.0360479	0.0578742	0.0672078	0.0573738	0.0556013	0.0417527	0.0006185	0.0005882
Distribution stations	0.0031121	0.0031121	0.0036340	0.0034651	0.0021583	0.0034651	0.0040239	0.0010305	0.0002778	0.0013826	0.0000370	0.0005882
Distribution Primary feeder	-	-	-	-	-	-	-	-	-	-	-	-
Local distribution facilities (Transf. & local conductors)	2.8304889	0.4402960	0.6724213	1.8018608	0.5224704	0.3565511	0.3975410	0.0000000	0.0000000	0.0000000	0.4381502	0.5216290
Average Marginal cost per kWh	2.8855788	0.4953859	0.7367512	1.8632001	0.5606766	0.4178904	0.4687727	0.0584044	0.0558792	0.0431353	0.4388057	0.5228054

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 19-057

Date Request Received: 10/11/2019

Date of Response: 10/25/2019

Request No. STAFF 14-041

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Request from: New Hampshire Public Utilities Commission Staff

Witness: Edward A. Davis, Amparo Nieto

Request:

Refer to con_19-057_res_oca_6_105_d_att_eversource.xlsx (confidential), tab "Substation Reliability," and con_19-057_res_oca_2_51_a_att_eversource.xlsx (confidential), tab "Capital Budget Bulk Stat W2."

- a. Please confirm that the projects in rows 15-17 and 20-21 of the Eversource Capital Budget are included in the Eversource MCOSS Model.
- b. Please explain the following discrepancies between the projects listed in the Capital Budget vs. in the MCOSS Model:
 1. Huse Rd.: The MCOSS (in row 10) reports 2020 costs of \$1M, while the Capital Budget (in row 20) reports no costs in 2020.
 2. Monadnock: The MCOSS (in row 12) reports 2019 costs of \$1M, while the Capital Budget (row 16) reports 2019 costs of \$500K.
 3. Madbury: The MCOSS (row 13) reports 2021 costs of \$1M, while the Capital Budget (row 21) reports no costs in 2020.
- c. Please explain why the Long Hill project included in the MCOSS (row 14), but not part of the Capital Budget.

Response:

- a) That is correct.
- b) The total project cost per transformer was estimated at \$2.5m. The replacement of a transformer typically requires engineering, site work, protection upgrades and other commissioning costs. We broke down the \$2.5 m so that about 20 percent of the cost would take place the year before the transformer would become operative, and 80 percent the year the transformer would be operative. In other words, the full replacement work for each transformer is assumed to be completed over two years. This split is mainly cosmetic and does not affect the resulting marginal cost estimate since, as explained in answer to Question 14-40, no discounted cost approach was used.
- c) The Capital Budget includes a Long Hill project, in line 23, which incorrectly states "Pine Hill" in the version that the Staff received. A correction was made by the Company to replace Pine Hill with "Long Hill" in the budget file on April 2019. This revision was noted by the MCOS study but did not get to the version of the Excel file that was submitted as part of the back-up documentation.

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	2019		2020	
	Actual	Budget	Actual	Budget
Administrative	1,234,567	1,234,567	1,234,567	1,234,567
Capital	567,890	567,890	567,890	567,890
Operating	3,456,789	3,456,789	3,456,789	3,456,789
Program	2,345,678	2,345,678	2,345,678	2,345,678
Support	1,111,111	1,111,111	1,111,111	1,111,111
Other	987,654	987,654	987,654	987,654
Total	7,147,918	7,147,918	7,147,918	7,147,918

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	2019	2020
1. Revenue	100%	100%
2. Operating Expenses	85%	85%
3. Operating Income	15%	15%
4. Non-Operating Expenses	5%	5%
5. Non-Operating Income	0%	0%
6. Income Before Taxes	10%	10%
7. Income Tax Expense	3%	3%
8. Net Income	7%	7%
9. Other Comprehensive Income	0%	0%
10. Comprehensive Income	7%	7%

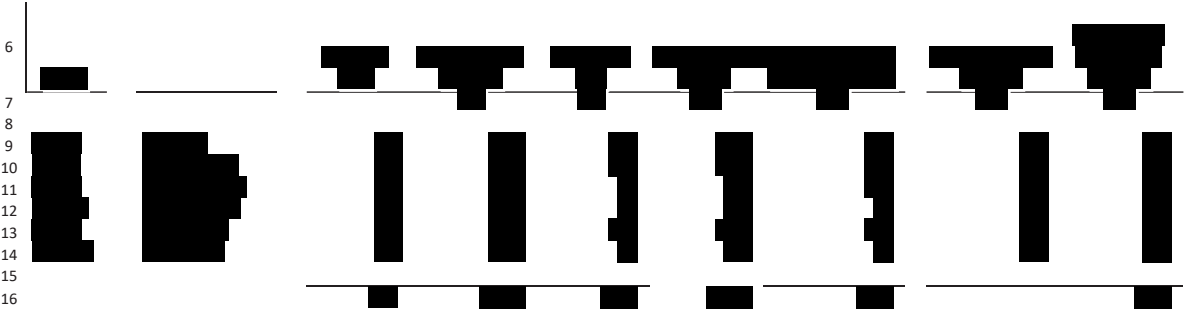
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Dated 6/24/19
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PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
D/B/A, EVERSOURCE ENERGY
BACK-UP CALCULATION OF BULK DISTRIBUTION SUBSTATIONS - CAPACITY-EXPANSION INVESTMENT (2020 - 2024)



PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
D/B/A, EVERSOURCE ENERGY
BACK-UP CALCULATION OF NON-BULK DISTRIBUTION SUBSTATIONS - CAPACITY EXPANSION INVESTMENT (2020-2024)

[illegible]

**PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
D/B/A, EVERSOURCE ENERGY
MARGINAL SERVICE INVESTMENT
BY CUSTOMER CLASS**

The diagram illustrates a mapping between a set of 16 horizontal bars (labeled A through P) and a set of 16 vertical bars (labeled 1 through 16). The horizontal bars are grouped into four sets of four, each corresponding to one of the vertical bars. The vertical bars are labeled with numbers 1 through 16 at the top. The horizontal bars are labeled with letters A through P at the top. The diagram shows that the horizontal bars are grouped into four sets of four, each corresponding to one of the vertical bars. The vertical bars are labeled with numbers 1 through 16 at the top. The horizontal bars are labeled with letters A through P at the top. The diagram illustrates how the horizontal bars are grouped into four sets of four, each corresponding to one of the vertical bars.

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 19-057

Date Request Received: 10/11/2019

Date of Response: 10/25/2019

Request No. STAFF 14-040

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Edward A. Davis, Amparo Nieto

Request:

Refer to Nieto testimony, Bates 001769, "To compute the marginal cost of bulk and distribution stations we divided the identified peak-load related station investment by station's project added capacity."

- a. Please confirm that the peak-load related station investments are in constant dollars.
- b. Please confirm that the marginal cost calculation does not discount the investments and thereby weighs a \$1 investment made in 2020 the same as a \$1 investment made in 2021, 2022, 2023, and 2024.
- c. If the answer to b is yes, please explain why investments should not be discounted for marginal cost calculations.

Response:

- a) Yes, all dollars of investment are stated already in 2019 dollars.
- b) The marginal cost calculation takes inflation into account. Thereby \$1 of investment in year 2021 is assumed to be $\$1/(1+\text{inflation})$ in year 2019.
- c) The marginal cost that the study aims to estimate is the incremental or decremental cost associated with change in a unit of demand across the entire five-year period. The study does not presume the year the particular load change will take place. Thus, it does not seek to estimate the incremental (or avoided) cost that the Company would experience if the load growth (or load reduction) took place in year 1 (2020) vs. year 2 (2021), etc. The MCOS study is designed to inform the ongoing marginal cost impact through distribution rates, which will be fixed for the foreseeable three or four years as opposed to being updated on an annual basis. In addition, in practice, the timing for a particular planned substations investment may shift by one year or more for reasons unrelated to station load, such as changes in the pace of available funds, or other reasons. In short, adopting a discounted cost approach would not add accuracy to the marginal cost calculation due to the purpose of the MCOS study coupled with the inherent uncertainty in the precise timing of the distribution investment project over the five-year period.

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Docket No. DE 19-057
Data Request Staff 14-043
Dated 10/11/19
Attachment Staff 14-043
Page 1 of 1

Staff 14-043 Confidential Response

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Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 19-057

Date Request Received: 10/11/2019

Date of Response: 10/25/2019

Request No. STAFF 14-007

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Edward A. Davis, Amparo Nieto

Request:

Refer to MCOSS Study Report (Att. MCOSS-1), Bates 001768-69: "The 2019 MCOS utilizes project expectations as per the Company's capital plan over years 2020-2024...." Please identify non-bulk projects in the Eversource Capital Budget that are included in the MCOSS.

Response:

The Company's five-year capital plan at the time of conducting the MCOS study anticipated three non-bulk capacity expansion stations in years 2022 through 2024. These investments are noted in Confidential Attachment OCA 6-105 under tab "Substation Peak" and under the line item "Substation Peak Load Project". The Company has not formalized the specific investment and therefore cost detail was not available. However, recognizing that some peak load investment will take place, the MCOS study assumed, upon consultation with the Company, that this project will at least involve installation of three 12.5 MVA transformers, replacing three existing transformers (two of 5.25 MVA and one 6.25 MVA).

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Data Request Staff 14-043
Dated 10/11/19
Attachment Staff 14-043
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Staff 14-043 Confidential Response

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Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 19-057

Date Request Received: 10/11/2019

Date of Response: 10/25/2019

Request No. STAFF 14-042

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Edward A. Davis, Amparo Nieto

Request:

Refer to confidential con_19-057_res_oca_2_51_a_att_eversource.xlsx, tab "Capital Budget Bulk Stat W2."

- a. Refer to total costs in 2019 \$ (col K):
 1. Explain why project costs are not discounted.
 2. Explain why 2019 project costs included in the total costs.
- b. Refer to Project added load carrying capability in MVA (col AD):
 1. Explain why the incremental load carrying capability used in the cost unitization calculation reflect the total incremental capability of the project, rather than the incremental capability needed to meet load growth.
 2. Explain why the conversion from MW to MVA not involve power factors.

Response:

a)

1. Please see response to 14-040.
2. The Company anticipated that a share of the costs of the substation projects that will be in service by end of 2020 and 2021 would be incurred in 2019. Construction of these transformers is scheduled to begin in 2020, only a small amount of engineering costs has been incurred in 2019 to date. The MCOS study needs to capture the full cost of each transformer upgrade in order to be representative of the typical marginal cost associated with growth of bulk station-coincident peak demand.

b)

1. The substation transformer comes in standard sizes and transformer investment has economies of scale, meaning the per unit cost of larger transformer is lower than the per-unit cost of smaller transformer. Using the added load-carrying capability of the transformer as opposed to just the kW of capacity needed to solve the constraint over the next five years smooths out the lumpiness effect of the substation investment and at the same time allows the study to capture the economies of scale.
2. The Company applies power factor correction measures to ensure that the power factor approaches unity at the low side of the transformer before considering other mitigation measures, therefore 1 MW is assumed to be equal to 1 MVA.

Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 19-057

Date Request Received: 10/11/2019

Date of Response: 10/25/2019

Request No. STAFF 14-036

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Edward A. Davis, Amparo Nieto

Request:

Refer to 19-057_res_oqa_7_14_att_(REPLACEMENT 051-G).eversource.xlsx, tab "Summary."

- a. In column D, why is the average net facilities cost based on estimated costs, rather than actual costs?
- b. In column F, what is the source of the average OH/UG split?

Response:

- a) The calculation of typical connection costs by class that would need to be recovered in rates produces a more realistic number when relying on the estimated net facilities costs because the up-front payment by the customer is based on the estimated cost of the job rather than ultimate cost of completing the job. There are situations when the job cost estimate may be higher or lower than the ultimate connect costs. In those cases the customer up-front payment is higher or lower than the customer contribution that would have been requested ex-post.
- b) Information on existing breakdown of underground vs overhead transformers was provided by the Company. Please see Attachment Staff 14-037 for the source of the OH/UG split.

**Average Single-Phase Facilities Costs in 2019 Dollars
Overhead and Underground, 2015 - 2017**

(Rounded to standard design)

Construction Type	Include Transformer?	Average Gross Facilities Cost per kVA (2019\$)	Average Net Facilities Cost (after CIAC) per KVA (2019\$)	Average OH/UG split	Average Transformer Cost per kVA (2019\$)	Average Transformer Size per Work Order (kVA)	Median Transformer Size (KVA)	Average Transformer Size (kVA)	No. of Residential customers per transformer 1-ph	Average kVA per Customer (residential)	No. of GS 1-ph Customers per Transformer	Average kVA per Customer (GS)
UG 1 PH	Y	\$174.04	\$126.77	0.21	\$100.29	46.1	37.5	50	2.6	19.23	1.55	32.26
OH 1 PH	Y	\$191.79	\$115.98	0.79	\$64.78	29.4	25.0	25	2.6	9.62	1.55	16.13
Average Cost (after CIAC)			\$118.24						Weighted Average kVA (1-ph)	11.63	Weighted Average kVA (1-ph)	19.52

Service Drop Drop	2019\$ Gross \$/ft	2019\$ Net \$/ft
OH	11.85	11.76
UG	10.82	11.76

**Average Three-Phase Facilities Costs in 2019 Dollars
Overhead and Underground, 2015 - 2017**

Construction Type	Include Transformer?	Average Gross Facilities Cost per kVA (2019\$)	Average Net Facilities Cost (after CIAC) per KVA (2019\$)	Average OH/UG split	Average Transformer Cost per kVA (2019\$)	Median Transformer Size (KVA)	Max Size (KVA)	No. of customers per transformer GS-3ph	kVA per GS Customer
UG	Y	\$168.87	\$141.26	0.39	\$80.77	50.0	175.0	1.9	26.32
OH	Y	\$229.67	\$220.91	0.61	\$84.49	50.0	150.0	1.9	26.32
Average Cost (after CIAC)				\$189.85				Weighted Average kVA (3-ph)	\$26.32 kVA



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Case No.	Case Name	Case Address	Case City	Case State	Case Zip	Case Phone	Case Email	Case Date	Case Time	Case Status	Case Notes
1	John Doe	123 Main St	New York	NY	10001	212-555-1234	john.doe@example.com	2023-10-26	14:30	Completed	Client satisfied with service.
2	Jane Smith	456 Elm St	Los Angeles	CA	90001	310-555-5678	jane.smith@example.com	2023-10-27	10:00	In Progress	Waiting for client response.
3	Michael Johnson	789 Oak St	Chicago	IL	60601	312-555-9012	michael.johnson@example.com	2023-10-28	09:00	Pending	Client on hold.
4	Sarah Williams	101 Pine St	San Francisco	CA	94101	415-555-3456	sarah.williams@example.com	2023-10-29	11:00	Completed	Project completed successfully.
5	David Brown	202 Cedar St	Phoenix	AZ	85001	602-555-7890	david.brown@example.com	2023-10-30	13:00	In Progress	Client meeting scheduled.
6	Emily Davis	303 Birch St	Philadelphia	PA	19101	215-555-2345	emily.davis@example.com	2023-10-31	15:00	Pending	Client review in progress.
7	Robert Miller	404 Maple St	San Diego	CA	92101	619-555-6789	robert.miller@example.com	2023-11-01	10:00	Completed	Final report submitted.
8	Laura Wilson	505 Elm St	Portland	OR	97201	503-555-1011	laura.wilson@example.com	2023-11-02	12:00	In Progress	Client feedback received.
9	James Taylor	606 Oak St	Seattle	WA	98101	206-555-4567	james.taylor@example.com	2023-11-03	14:00	Pending	Client on hold.
10	Amanda White	707 Pine St	Denver	CO	80201	303-555-8901	amanda.white@example.com	2023-11-04	11:00	Completed	Project completed successfully.
11	Christopher Lee	808 Cedar St	San Jose	CA	95101	408-555-2345	christopher.lee@example.com	2023-11-05	13:00	In Progress	Client meeting scheduled.
12	Nicole Green	909 Birch St	San Antonio	TX	78201	214-555-6789	nicole.green@example.com	2023-11-06	15:00	Pending	Client review in progress.
13	Kevin Black	1010 Maple St	San Francisco	CA	94101	415-555-1011	kevin.black@example.com	2023-11-07	10:00	Completed	Final report submitted.
14	Michelle Hall	1111 Elm St	San Diego	CA	92101	619-555-2345	michelle.hall@example.com	2023-11-08	12:00	In Progress	Client feedback received.
15	Andrew King	1212 Oak St	San Jose	CA	95101	408-555-3456	andrew.king@example.com	2023-11-09	14:00	Pending	Client on hold.
16	Stephanie Young	1313 Pine St	San Francisco	CA	94101	415-555-4567	stephanie.young@example.com	2023-11-10	11:00	Completed	Project completed successfully.
17	Brandon Scott	1414 Cedar St	San Diego	CA	92101	619-555-5678	brandon.scott@example.com	2023-11-11	13:00	In Progress	Client meeting scheduled.
18	Christina Adams	1515 Birch St	San Jose	CA	95101	408-555-6789	christina.adams@example.com	2023-11-12	15:00	Pending	Client review in progress.
19	Gregory Baker	1616 Maple St	San Francisco	CA	94101	415-555-7890	gregory.baker@example.com	2023-11-13	10:00	Completed	Final report submitted.
20	Heather Clark	1717 Elm St	San Diego	CA	92101	619-555-8901	heather.clark@example.com	2023-11-14	12:00	In Progress	Client feedback received.
21	Timothy Evans	1818 Oak St	San Jose	CA	95101	408-555-9012	timothy.evans@example.com	2023-11-15	14:00	Pending	Client on hold.
22	Angela Harris	1919 Pine St	San Francisco	CA	94101	415-555-0123	angela.harris@example.com	2023-11-16	11:00	Completed	Project completed successfully.
23	Jonathan Lewis	2020 Cedar St	San Diego	CA	92101	619-555-1234	jonathan.lewis@example.com	2023-11-17	13:00	In Progress	Client meeting scheduled.
24	Kimberly Walker	2121 Birch St	San Jose	CA	95101	408-555-2345	kimberly.walker@example.com	2023-11-18	15:00	Pending	Client review in progress.
25	Benjamin Hall	2222 Maple St	San Francisco	CA	94101	415-555-3456	benjamin.hall@example.com	2023-11-19	10:00	Completed	Final report submitted.
26	Rebecca King	2323 Elm St	San Diego	CA	92101	619-555-4567	rebecca.king@example.com	2023-11-20	12:00	In Progress	Client feedback received.
27	Eric Young	2424 Oak St	San Jose	CA	95101	408-555-5678	eric.young@example.com	2023-11-21	14:00	Pending	Client on hold.
28	Victoria Scott	2525 Pine St	San Francisco	CA	94101	415-555-6789	victoria.scott@example.com	2023-11-22	11:00	Completed	Project completed successfully.
29	Christopher Adams	2626 Cedar St	San Diego	CA	92101	619-555-7890	christopher.adams@example.com	2023-11-23	13:00	In Progress	Client meeting scheduled.
30	Michelle Baker	2727 Birch St	San Jose	CA	95101	408-555-8901	michelle.baker@example.com	2023-11-24	1		

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Public Service of New Hampshire d/b/a Eversource Energy
Docket No. DE 19-057

Date Request Received: 10/11/2019

Date of Response: 10/25/2019

Request No. STAFF 14-038

Page 1 of 1

Request from: New Hampshire Public Utilities Commission Staff

Witness: Edward A. Davis, Amparo Nieto

Request:

Refer to Nieto testimony on time differentiation, Bates 001771, "The MCOS uses hourly probability of peak factors for each typical weekday and weekend by month to allocate the annual marginal bulk station and non-bulk station costs to hours and months."

- a. Please describe in detail the methodology used to develop the probability of peak factors.
- b. Please refer to other instances where Ms. Nieto has used the same methodology.
- c. Please provide citations to the costing literature for support of the methodology.

Response:

Please see Confidential Attachment Staff 14-038 for the response.

Pursuant to Puc 203.08(d) and RSA 363:28, VI, Eversource provides this response on a confidential basis to the Commission Staff and the Office of Consumer Advocate. Eversource submits that it has a good faith basis for seeking confidential treatment of the documents in this response and that it intends to submit a motion for confidential treatment of the documents prior to the commencement of any hearing in this proceeding.

Redacted

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Data Request Staff 14-038
Dated 10/11/19
Attachment Staff 14-038
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Staff 14-038

Confidential Response

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