🗟 C.K. Woo

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ENERGY AND ENVIRONMENTAL ECONOMICS, INC.

Senior Partner

Dr. Woo specializes in energy economics, applied microeconomics and applied finance. With over 30 years of experience in the electricity industry, he has testified and prepared expert testimony for use in regulatory and legal proceedings in California, British Columbia and Ontario. He has also filed declaration for and testified in arbitration in connection to contract dispute. Dr. Woo's current research includes electricity deregulation, procurement, risk management, demand response and rationing, avoided cost estimation, integrated resource planning, and value of service reliability.

Dr. Woo has published over 140 refereed articles that appear in such scholarly journals as Energy Policy, Energy Law Journal, The Energy Journal, Energy, Electricity Journal, Resource and Energy Economics, Energy Economics, IEEE Transactions on Power Systems, IEEE Transactions on Smart Grid, Water Resources Research, Managerial and Decision Economics, OMEGA, Journal of Regulatory Economics, Journal of Public Economics, Quarterly Journal of Economics, Economics Letters, Journal of Business Finance and Accounting, and Pacific Basin Finance Journal.

Recognized by Who's Who in America, Dr. Woo is a senior fellow of the United States Association for Energy Economics; an editorial board member of *Energy* and their guest editor of a 2006 special issue on electricity market reform and deregulation and a 2010 special issue on demand response resources; an editorial board member of The Energy Journal and has served as their guest editor of a 1988 special issue on electricity reliability; and an editorial board member of *Energy Policy* and their guest editor of a 2011 special issue on renewable energy. Dr. Woo received a Ph.D. in Economics from the University of California at Davis.

CITY UNIVERSITY OF HONG KONG	Hong Kong, China
Associate Professor, Department of Economics and Finance	1991 – 1993

Dr. Woo analyzed the economic impacts of supply shortage on consumers, resulting in a series of publications on water and electricity rationing. He also performed specification tests of econometric models of stock returns. As a consultant, he performed marginal costing, demand-side-management evaluation and reliability planning which led to several publications on local integrated resource planning and T&D costing.

ANALYSIS GROUP, INC. Senior Associate

Dr. Woo was responsible for applied microeconomics, outage cost estimation, reliability planning, and electricity pricing. He was the primary consultant to several utilities for outage cost estimation and reliability differentiation. His extensive publications in these two areas are widely cited by other researchers. He also performed economic analysis of mergers and acquisition with a primary focus on

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1993 – Present

San Francisco, CA

91 - 1993

San Francisco, CA 1987 - 1991 the anti-trust aspect of market power, with the resulting findings filed with both state and federal courts.

PACIFIC	GAS AND	ELECTRIC	COMPANY
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Rate Economist

Dr. Woo revamped PG&E's research on outage cost estimation whose findings appear in a special issue of The Energy Journal focusing on electricity reliability. He also participated in PG&E's preparation of the General Rate Cases.

SACRAMENTO MUNICIPAL UTILITIES DISTRICT	Sacramento, CA
Econometrician	1984 – 1985

Dr. Woo was responsible for demand estimation and load forecasting. The results from his study guided SMUD's resource planning.

PACIFIC GAS AND ELECTRIC COMPANY	San Francisco, CA
Rate Economist	1982 – 1984

Dr. Woo was responsible for time-of-use (TOU) demand analysis and TOU pricing mandated by the CPUC. This work resulted in a performance award from PG&E and several publications.

CALIFORNIA ENERGY COMMISSION	Sacramento, CA
Research Assistant	1978 – 1982

Dr. Woo was the primary author of the life cycle costing model used by the CEC to analyze solar energy and other DSM measures. He testified before the CPUC on the economics of solar financing.

Education

University of California Ph.D. in Economics	Davis, CA
Queen's University M.A. in Economics	Kingston, Ontario
Concordia University B. Comm. in Economics	Montreal, Quebec
Languages	
Chinese	

Citizenship

United States

San Francisco, CA 1985 - 1987

RESEARCH

Books and special issues

- 1. Cheung, Y.L., Y.S. Cheng and C.K. Woo (2017) Hong Kong's Global Financial Centre and China's Development, Routledge.
- 2. Woo, C.K., L.C.H. Chow and T. Owen, editors (2011) Special Issue on Renewable Energy, Energy Policy, 39(7).
- 3. Woo, C.K. and L. Greening, editors (2010) Special Issue on Demand Response Resources, Energy, 35(4).
- 4. Woo, C.K., L.C.H. Chow and N. Lior, editors (2006) Special Issue on Electricity Market Reform and Deregulation, Energy, 31(6-7).
- 5. Munasinghe, M., C.K. Woo and H.P. Chao, editors (1988) Special Electricity Reliability Issue, The Energy Journal, 9.

Refereed Publications

Market reform and deregulation

- 1. Gal, N., I. Milstein, A. Tishler and C.K. Woo (2017) "Fuel cost uncertainty, capacity investment and price in a competitive electricity market," Energy Economics, 61, 233-240.
- 2. Orans, R., A. Olson, J. Moore, J. Hargreaves, R. Jones, G. Kwok, F. Kahrl, and C.K. Woo (2013) "Energy imbalance market benefits in the West: a case study of PacifiCorp and CAISO," Electricity Journal, 26(5), 26-36.
- 3. Tishler, A. and C.K. Woo (2010) "Principles of regulation in electricity markets," The Economic Quarterly (in Hebrew), 57(1), 77-97.
- 4. Woo, C.K., I. Horowitz and A. Tishler (2009) "A critical assessment of the Macau SAR Government's proposed post-2010 regulatory regime," Electricity Journal, 22(3), 87-96.
- 5. Woo, C.K. and J. Zarnikau (2009) "Will electricity market reform likely reduce retail rates?" Electricity Journal, 22(2), 40-45.
- 6. Tishler, A., I. Milstein and C.K. Woo (2008) "Capacity commitment and price volatility in a competitive electricity market," Energy Economics, 30, 1625-1647.
- 7. Tishler, A., J. Newman, I. Spekterman, and C.K. Woo (2008) "Assessing the options for a competitive electricity market in Israel," Utilities Policy, 16, 21-29.
- 8. Tishler, A. and C.K. Woo (2007) "Is electricity deregulation beneficial to Israel?" International Journal of Energy Sector Management, 1(4), 322-341.
- 9. Woo, C.K., I. Horowitz and A. Tishler (2006) "A critical assessment of the Hong Kong Government's proposed post-2008 regulatory regime for local electricity utilities," Energy Policy, 34, 1451-1456. (Lead article)

- 10. Woo, C.K., M. King, A. Tishler, and L.C.H. Chow (2006) "Costs of electricity deregulation," Energy, 31(6-7), 747-768. (Lead article after Guest Editors' Introduction, one of the 25 most downloaded articles)
- 11. Tishler, A. and C.K. Woo (2006) "Likely failure of electricity deregulation: explanation with application to Israel," Energy, 31(6-7), 845-856.
- 12. Tishler, A., J. Newman, I. Spekterman, and C.K. Woo (2006) "Cost-benefit analysis of reforming Israel's electricity industry," Energy Policy, 34(16), 2442-2454. (Lead article after Guest Editor's Introduction)
- 13. Woo, C.K., D. Lloyd, R. Karimov, and A. Tishler (2003) "Stranded cost recovery in electricity market reforms in the US," Energy, 28(1), 1-14. (Lead article)
- 14. Woo, C.K., D. Lloyd and A. Tishler (2003) "Electricity market reform failures: UK, Norway, Alberta and California," Energy Policy, 31(11), 1103-1115. (One of the 25 most downloaded articles)
- 15. Tishler, A., C.K. Woo and D. Lloyd (2002) "Reforming Israel's electric sector," Energy Policy, 30(4), 347-353.
- 16. Woo, C.K. (2001) "What went wrong in California's electricity market?" Energy, 26(8), 747-758.
- 17. Woo, C. K., I. Horowitz and J. Martin (1998) "Reliability differentiation of electricity transmission," Journal of Regulatory Economics, 13, 277-292.

Market price behavior

- 1. Woo, C.K., A. Olson, Y. Chen, J. Moore, N. Schlag, A. Ong, T. Ho (2017) "Does California's CO₂ price affect wholesale electricity prices in the western U.S.A.?" Energy Policy, 110, 9-19.
- 2. Woo, C.K., Y. Chen, A. Olson, J. Moore, N. Schlag, A. Ong and T. Ho (2017) "Electricity price behavior and carbon trading: new evidence from California," Applied Energy, 204, 531-543.
- 3. Olson, A., C.K. Woo, N. Schlag, and A. Ong (2016) "What happens in California does not always stay in California: the effect of California's cap-and-trade program on wholesale electricity prices in the Western Interconnection," The Electricity Journal, 29(7), 18-22.
- 4. Zarnikau, J., C.K. Woo and S.S. Zhu (2016) "Zonal merit-order effects of wind generation development on dayahead and real-time electricity market prices in Texas," Journal of Energy Markets, 9(4), 17-47.
- 5. Woo, C.K., J. Moore, B. Schneiderman, T. Ho, A. Olson, L. Alagappan, K. Chawla, N. Toyama, and J. Zarnikau (2016) "Merit-order effects of renewable energy and price divergence in California's day-ahead and real-time electricity markets," Energy Policy, 92, 299-312.
- 6. Woo, C.K., J. Moore, B. Schneiderman, A. Olson, R. Jones, T. Ho, N. Toyama, J. Wang, and J. Zarnikau (2015) "Merit-order effects of day-ahead wind generation forecast in the hydro-rich Pacific Northwest," Electricity Journal, 28(9), 52-62.
- 7. Woo, C.K., T. Ho, J. Zarnikau, A. Olson, R. Jones, M. Chait, I. Horowitz, and J. Wang (2014) "Electricity-market price and nuclear power plant shutdown: evidence from California," Energy Policy, 73, 234-244.
- 8. Zarnikau, J., C.K. Woo and R. Baldick (2014) "Did the introduction of a nodal market structure impact wholesale electricity prices in the Texas (ERCOT) market?" Journal of Regulatory Economics, 45, 194-208.

- 9. Woo, C.K., J. Zarnikau, J. Kadish, I. Horowitz, J. Wang, and A. Olson (2013) "The impact of wind generation on wholesale electricity prices in the hydro-rich Pacific Northwest," IEEE Transactions on Power Systems, 28(4), 4245-4253.
- 10. Woo, C.K., I. Horowitz, J. Moore, and A. Pacheco (2011) "The impact of wind generation on the electricity spotmarket price level and variance: the Texas experience" Energy Policy, 39(7), 3939-3944.
- 11. Woo, C.K., J. Zarnikau, J. Moore, and I. Horowitz (2011) "Wind generation and zonal-market price divergence: evidence from Texas," Energy Policy, 39(7), 3928-3938.
- 12. Woo, C.K., I. Horowitz, N. Toyama, A. Olson, A. Lai, and R. Wan (2007) "Fundamental drivers of electricity prices in the Pacific Northwest," Advances in Quantitative Analysis of Finance and Accounting, 5, 299-323.
- 13. Woo, C.K., A. Olson, I. Horowitz, and S. Luk (2006) "Bi-directional causality in California's electricity and natural-gas markets," Energy Policy, 34(15), 2060-2070.
- 14. Woo, C.K., D. Lloyd-Zannetti and I. Horowitz (1997) "Electricity market integration in the Pacific Northwest," The Energy Journal, 18(3), 75-101.

Contracts and profitability

- 1. Woo, C.K., J. Zarnikau, Y. Chen, A. Olson, J. Moore. T. Ho, Y. Liu and X. Luo (2018) "An empirical analysis of California's hybrid capacity options," Electricity Journal, forthcoming.
- 2. Liu, Y. and C.K. Woo (2017) "California's renewable generation and pumped hydro storage's profitability," Electricity Journal, 30(3), 15-22.
- 3. Liu, Y., C.K. Woo and J. Zarnikau (2017) "Wind generation's effect on the ex post variable profit of compressed air energy storage: evidence from Texas," Journal of Energy Storage, 9, 25-39.
- Woo, C.K., I. Horowitz, J. Zarnikau, J. Moore, B. Schneiderman, T. Ho, and E. Leung (2016) "What moves the ex post variable profit of natural-gas-fired generation in California?" The Energy Journal, 37(3), 29-57, <u>http://dx.doi.org/10.5547/01956574.37.3.cwoo</u>
- 5. Liu, Y., C.K. Woo and J. Zarnikau (2016) "Ex post payoffs of a tolling agreement for natural-gas-fired generation in Texas," Journal of Energy Markets, 9(1), 21-45.
- 6. Woo, C.K., I. Horowitz, B. Horii, R. Orans, and J. Zarnikau (2012) "Blowing in the wind: vanishing payoffs of a tolling agreement for natural-gas-fired generation of electricity in Texas," The Energy Journal, 33(1), 207-229.
- 7. DeBenedictis, A., D. Miller, J. Moore, A. Olson, and C.K. Woo (2011) "How big is the risk premium in an electricity forward price? Evidence from the Pacific Northwest," Electricity Journal, 24(3), 72-76.
- 8. Moore, J., C.K. Woo, B. Horii, S. Price, and A. Olson (2010) "Estimating the option value of a non-firm electricity tariff," Energy, 35, 1609-1614.
- 9. Orans, R., C.K. Woo and W. Clayton (2004) "Benchmarking the price reasonableness of a long-term electricity contract," Energy Law Journal, 25(2), 357-383.
- 10. Woo, C.K., A. Olson and R. Orans (2004) "Benchmarking the price reasonableness of an electricity tolling agreement," Electricity Journal, 17(5), 65-75. (One of the 25 most downloaded articles)

- 11. Woo, C.K., I. Horowitz and K. Hoang (2001) "Cross hedging and value at risk: wholesale electricity forward contracts," Advances in Investment Analysis and Portfolio Management, 8, 283-301.
- 12. Woo, C.K., I. Horowitz and K. Hoang (2001) "Cross hedging and forward-contract pricing of electricity," Energy Economics, 23, 1-15. (Lead article and one of the 10 most cited recent papers published in Energy Economics, see Tol, R.J.S. and J.P. Weyant (2006) "Energy Economics' most influential papers," Energy Economics, 28:4, 405-409)

Procurement

- 1. Woo, C.K., I. Horowitz, G. Kwok, S.K. Wan, and W.W. Weng (2013) "A win-win mechanism for electricity procurement by a local distribution company," Electricity Journal, 26(1), 27-35.
- 2. Woo, C.K., B. Horii, M. Chait, and I. Horowitz (2008) "Should a lower discount rate be used for evaluating a tolling agreement than used for a renewable energy contract?" Electricity Journal, 21(9), 35-40.
- 3. Orans, R., S. Price, J. Williams, C.K. Woo, and J. Moore (2007) "A Northern California British Columbia partnership for renewable energy" Energy Policy, 35(8), 3979-3983.
- 4. Woo, C.K., I. Horowitz, A. Olson, B. Horii, and C. Baskette (2006) "Efficient frontiers for electricity procurement by an LDC with multiple purchase options," OMEGA, 34(1), 70-80.
- 5. Woo, C.K., I. Horowitz, B. Horii, and R. Karimov (2004) "The efficient frontier for spot and forward purchases: an Application to electricity," Journal of the Operational Research Society, 55, 1130-1136.
- 6. Woo, C.K., D. Lloyd and W. Clayton (2006) "Did a local distribution company procure prudently during the California electricity crisis?" Energy Policy, 34(16), 2552-2565.
- 7. Woo, C.K., R. Karimov and I. Horowitz (2004) "Managing electricity procurement cost and risk by a local distribution company," Energy Policy, 32(5), 635-645.
- 8. Lloyd, D., C.K. Woo, M. Borden, R. Warrington, and C. Baskette (2004) "Competitive procurement and internetbased auction: electricity capacity option," Electricity Journal, 17(4), 74-78. (One of the 25 most downloaded articles)
- 9. Woo, C.K., D. Lloyd, M. Borden, R. Warrington, and C. Baskette (2004) "A robust internet-based auction to procure electricity forwards," Energy, 29(1), 1-11. (Lead article)
- 10. Woo, C.K., M. Borden, R. Warrington and W. Cheng (2003) "Avoiding overpriced risk management: exploring the cyber auction alternative," Public Utilities Fortnightly, 141(2), 30-37.

Demand response and capacity rationing

- 1. Woo, C.K., P. Sreedharan, J. Hargreaves, F. Kahrl, J. Wang, and I. Horowitz (2014) "A review of electricity product differentiation," Applied Energy, 114, 262-272.
- 2. Woo, C.K. and L. Greening (2010) "Guest Editors' Introduction," Energy, 35, 1515-1517.
- 3. Woo, C.K., E. Kollman, R. Orans, S. Price, and B. Horii (2008) "Now that California has AMI, what can the state do with it?" Energy Policy, 36, 1366-74.
- 4. Horowitz, I. and C.K. Woo (2006) "Designing Pareto-superior demand-response rate options," Energy, 31(6-7), 1040-1051.

- 5. Hartway, R., S. Price and C.K. Woo (1999) "Smart meters, customer choice and profitable time of use rate option," Energy, 24, 895-903.
- 6. Woo, C.K., P. Chow and I. Horowitz (1996) "Optional real-time pricing of electricity for industrial Firms," Pacific Economic Review, 1(1), 79-92.
- 7. Woo, C.K., R. Orans, B. Horii, and P. Chow (1995) "Pareto-superior time-of-use rate option for industrial firms," Economics Letters, 49, 267-272.
- 8. Woo, C.K. (1993) "Efficient electricity pricing with self-rationing: reply," Journal of Regulatory Economics, 5(1), 101-102.
- 9. Woo, C.K. (1992) "Optimal electricity pricing and capacity rationing," Hong Kong Economic Papers, 22, 1-6.
- 10. Woo, C.K. (1991) "Capacity rationing and fixed cost collection," The Energy Journal, 12(2), 153-164.
- 11. Woo, C.K. (1990) "Efficient electricity pricing with self-rationing," Journal of Regulatory Economics, 2(1), 69-81. Reprinted in Rees R. (2006) The Economics of Public Utilities, The International Library of Critical Writings in Economics Series 196, Edward Elgar.
- 12. Woo, C.K. and N. Toyama (1986) "Service reliability and the optimal interruptible rate option in residential electricity pricing," The Energy Journal, 7(3), 123-136.

Demand estimation

- 1. Woo, C.K., A. Shiu, Y. Liu, X. Luo and J. Zarnikau (2018) "Consumption effects of an electricity decarbonization policy: Hong Kong," Energy, 144, 887-902.
- 2. Woo, C.K., Y. Liu, X. Luo, A. Shiu and J. Zarnikau (2017) "Consumption effects of electricity decarbonization: evidence from California and the Pacific Northwest," Electricity Journal, 30(10), 44-49.
- 3. Woo, C.K., J. Zarnikau, A. Shiu and R. Li (2017) "Winter residential optional dynamic pricing: British Columbia, Canada," The Energy Journal, 38(5), 99-111.
- 4. Woo, C.K., J. Zarnikau, R. Li, and A. Shiu (2016) "kWh Effects of residential optional dynamic pricing: winter evidence from British Columbia, Canada," Electricity Journal, 29(9), 44-47.
- 5. Li, M., R. Orans, J. Kahn-Lang, and C.K. Woo (2014) "Are residential customers price-responsive to an inclining block rate? Evidence from British Columbia, Canada," Electricity Journal, 27(1), 85-92.
- 6. Woo, C.K., I. Horowitz and I. Sulyma (2013) "Relative kW Response to residential time-varying pricing in British Columbia," IEEE Transactions on Smart Grid, 4(4), 1852-1860.
- 7. Woo, C.K., R. Li, A. Shiu and I. Horowitz (2013) "Residential winter kWh responsiveness under optional timevarying pricing in British Columbia," Applied Energy, 108, 288-297.
- 8. Woo, C.K., P. Hanser and N. Toyama (1986) "Estimating hourly electric load with generalized least squares procedures," The Energy Journal, 7(2), 153-170.
- 9. Woo, C.K. (1985) "Demand for electricity of small nonresidential customers under time-of-use pricing," The Energy Journal, 6(4), 115-127.

10. Woo, C.K. (1984) "A note on measuring household welfare effects of time-of-use pricing," The Energy Journal, 5(3), 171-181.

Rate design

- 1. Woo, C.K. and J. Zarnikau (2017) "A solar rate option for the development of behind-the-meter photovoltaic systems," Electricity Journal, 30(3), 1-3. (Lead article)
- 2. Orans, R., C.K. Woo, B. Horii, M. Chait, and A. DeBenedictis (2010) "Electricity pricing for conservation and load shifting," Electricity Journal, 23(3), 7-14.
- 3. Orans, R., M. King, C.K. Woo, and W. Morrow (2009) "Inclining for the climate: GHG reduction via residential electricity ratemaking," Public Utilities Fortnightly, 147(5), 40-45.
- 4. Woo, C. K., B. Horii and I. Horowitz (2002) "The Hopkinson tariff alternative to TOU Rates in the Israel Electric Corporation," Managerial and Decision Economics, 23, 9-19.
- 5. Seeto, D. Q., C.K. Woo and I. Horowitz (2001) "Finessing the unintended outcomes of price-cap adjustments: an electric utility multi-product perspective," Energy Policy, 29(13), 1111-1118.
- 6. Seeto, D.Q., C. K. Woo and I. Horowitz (1997) "Time-of-use rates vs. Hopkinson tariffs redux: an analysis of the choice of rate structures in a regulated electricity distribution company," Energy Economics, 19, 169-185.
- 7. Horowitz, I., D.Q. Seeto and C.K. Woo (1996) "Ramsey pricing of electricity under unknown bypass costs," The Energy Journal, 17(2), 59-77.
- 8. Seeto, D.Q., S.D. He and C.K. Woo (1994) "Pricing electric harmonics," Energy, 20(7), 617-621.
- 9. Woo, C.K., B. Hobbs, R. Orans, R. Pupp and B. Horii (1994) "Emission costs, customer bypass and efficient pricing of electricity," The Energy Journal, 15(3), 43-54.
- 10. Woo, C.K. (1988) "Optimal electricity rates and consumption externality," Resources and Energy, 10, 277-292.
- 11. Woo, C.K. and D.Q. Seeto (1988) "Optimal off-peak incremental sales rate in electricity pricing," The Energy Journal, 9(1), 93-102.
- 12. Woo, C.K. (1988) "Inefficiency of avoided cost pricing of cogenerated power," The Energy Journal 9(1), 103-113.
- 13. Woo, C.K. (1985) "An application of the expenditure function in electricity pricing: optimal residential time-ofuse rate option," The Energy Journal, 6(2), 89-99.

Integrated resource planning

- 1. Cheng, Y.S., K.H. Cao, C.K. Woo and A. Yatchew (2017) "Residential willingness to pay for deep decarbonization of electricity supply: contingent valuation evidence from Hong Kong," Energy Policy, 109, 218-227.
- 2. Sreedharan, P., J. Farbes, E. Cutter, C.K. Woo, and J. Wang (2016) "Microgrid and renewable generation integration: University of California, San Diego," Applied Energy, 169, 709-720.
- 3. Cutter, E., B. Haley, J. Williams, and C.K. Woo (2014) "Cost-effective water-energy nexus: a California case study," Electricity Journal, 27(6), 61-68.

- 4. Woo, C.K., A. Shiu, Y.S. Cheng, R. Li, T. Ho, I. Horowitz, and J. Wang (2014) "Residential willingness-to-pay for reducing coal-fired generation's emissions in Hong Kong," Electricity Journal, 27(3), 50-66.
- 5. Lam, J.C.K., C.K. Woo, F. Kahrl, and W.K. Yu (2013) "What moves wind energy development in China? Show me the money!" Applied Energy, 105, 423-429.
- 6. Cutter, E., C.K. Woo, F. Kahrl, and A. Taylor (2012) "Maximizing the value of responsive load," Electricity Journal, 25(7), 6-16.
- 7. Woo, C.K., H. Liu, F. Kahrl, N. Schlag, J. Moore, and A. Olson (2012) "Assessing the economic value of transmission in Alberta's restructured electricity market," Electricity Journal, 25(3), 68-80.
- 8. Sreedharan, P., D. Miller, S. Price, and C.K. Woo (2012) "Avoided cost estimation and cost-effectiveness of permanent load shifting in California," Applied Energy, 96, 115-121.
- 9. Alagappan, L., R. Orans and C.K. Woo (2011) "What drives renewable energy development?" Energy Policy, 39, 5099-5104.
- 10. Olson A., R. Orans, D. Allen, J. Moore, and C.K. Woo (2009) "Renewable portfolio standards, greenhouse gas reduction, and long-line transmission investments in the WECC," Electricity Journal, 22(9), 38-46.
- 11. Mahone, A., C.K. Woo, J. Williams, and I. Horowitz (2009) "Renewable portfolio standards and cost-effective energy efficiency investment," Energy Policy, 37(3), 774-777.
- 12. Heffner, G., C.K. Woo, B. Horii, and D. Lloyd-Zannetti (1998) "Variations in area- and time-specific marginal capacity costs of electricity distribution," IEEE Transactions on Power Systems, PE-493-PWRS-012-1997, 13(2), 560-567.
- 13. Forte, V.J., R. Pupp, R. Putnam and C.K. Woo (1995) "Using customer outage costs in electricity reliability planning," Energy, 20(2), 81-87.
- 14. Pupp, R., C.K.Woo, R. Orans, B. Horii, and G. Heffner (1995) "Load research and integrated local T&D planning," Energy, 20(2), 89-94.
- 15. Woo, C.K., D. Lloyd-Zannetti, R. Orans, B. Horii, and G. Heffner (1995) "Marginal capacity costs of electricity distribution and demand for distributed generation," The Energy Journal, 16(2), 111-130.
- 16. Woo, C.K., R. Orans, B. Horii, R. Pupp, and G. Heffner (1994) "Area- and time-specific marginal capacity costs of electricity distribution," Energy, 19(12), 1213-1218.
- 17. Orans, R., C.K. Woo and B. Horii (1994) "Targeting demand side management for electricity transmission and distribution benefits," Managerial and Decision Economics, 15, 169-175.
- 18. Orans, R., C.K. Woo, R. Pupp, and I. Horowitz (1994) "Demand side management and electric power exchange," Resource and Energy Economics, 16, 243-254.
- 19. Orans, R., C.K. Woo and R.L. Pupp (1994) "Demand side management and electric power exchange," Energy, 19(1), 63-66.
- 20. Keane, D.M. and C.K. Woo (1992) "Using customer outage costs to plan generation reliability," Energy, 17(9), 823-827.

Outage cost estimation

- 1. Woo, C.K., T. Ho, A. Shiu, Y.S. Cheng, I. Horowitz, and J. Wang (2014) "Residential outage cost estimation: Hong Kong," Energy Policy, 72, 204-210.
- 2. Cheng, Y.S., W.K. Wong and C.K. Woo (2013) "How much have electricity shortages hampered China's GDP growth?" Energy Policy, 55, 369-373.
- 3. Woo, C.K. and R.L. Pupp (1992) "Costs of service disruptions to electricity consumers," Energy, 17(2), 109-126.
- 4. Woo, C.K., R.L. Pupp, R. Mango, and T. Flaim (1991) "How much do electricity consumers want to pay for reliability?" Energy Systems and Policy, 15, 145-159.
- 5. Hartman, R.S., M.J. Doane and C.K. Woo (1990) "Status quo bias in the measurement of value of service," Resources and Energy, 12, 197-214.
- 6. Munasinghe, M., C.K. Woo and H.P. Chao (1988) "Guest Editors' Introduction," Special Electricity Reliability Issue, The Energy Journal, 9, i-iv.
- 7. Goett, A.A. D. McFadden and C.K. Woo (1988) "Estimating residential value of service reliability with market research data," The Energy Journal, 9, 105-120.
- 8. Woo, C.K. and K. Train (1988) "The cost of electric power interruption to commercial firms," The Energy Journal, 9, 161-172.
- 9. Doane, M.J., R.S. Hartman and C.K. Woo, (1988) "Households' perceived value of electric power service reliability: an analysis of contingent valuation data," The Energy Journal, 9, 135-149.
- 10. Doane, M.J., R.S. Hartman and C.K. Woo, (1988) "Household preferences of interruptible rate options and the revealed value of service reliability," The Energy Journal, 9, 121-134.
- 11. Keane, D.M., L.S. MacDonald and C.K. Woo (1988) "Estimating residential partial outage costs with market research data," The Energy Journal, 9, 151-159.

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- 3. "Winter Residential Optional Dynamic Pricing: British Columbia, Canada," Seminar organized by IEEE (HK), 12 December 2016, Hong Kong Polytechnic University.
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- 5. "Hong Kong's electricity market: What do consumers want?" Biennial Workshop of the Hong Kong Economic Association on Economic Analysis in Competition Law Enforcement: the Implications for the Region, 24 October 2015, Hong Kong.

- 6. "Public Consultation on the Future Development of the Electricity Market," IEEE JC Forum organized by IEEE (HK) Joint Chapter of Power & Energy Society, Industrial Application Society, Power Electronics Society and Industrial Electronics Society (PES/IAS/PELS/IES JC), 13 June 2015, Hong Kong Polytechnic University.
- 7. "Overview of Market Reform," Public Education Workshop on Hong Kong's Electricity Future hosted by the School of Business, Hong Kong Baptist University, 29 April 2015.
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- 10. "A review of electricity product differentiation," The 13th Annual Power Symposium 2014 On Dynamic & Flexible Response of Today's Power Network Operation to the Changing Environment, Power & Energy Section, The Institution of Engineering and Technology Hong Kong, 13 June 2014, Kowloon Shangri-La.
- 11. "Residential willingness-to-pay for reducing coal-fired generation's emissions in Hong Kong?" IEEE Seminar and Panel Discussion organized by IEEE (HK) Joint Chapter of Power & Energy Society, Industrial Application Society, Power Electronics Society and Industrial Electronics Society (PES/IAS/PELS/IES JC), 22 November 2013, Hong Kong Polytechnic University <http://www.ee.polyu.edu.hk/ieee/activities.htm>
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