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March 1, 2016

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VIA EMAIL

Public Utilities Board of Manitoba
400 – 330 Portage Avenue
Winnipeg, MB R3C 0C4

Attention: Darren Christle

Dear Sir:

**Re: Budget Estimate for General Service Small and General Service
Medium Representative (“GSS/GSM”)
Manitoba Hydro’s Cost of Service Study Methodology Review
Our File: 16028**

Dave Hill
Bob Sokalski
Sherri Walsh
Derek M. Olson
Christian Monnin
Kevin D. Toyne
Michael J. Weinstein
Rohith Mascarenhas
Jennifer L. Gaba
Brett A. Steidl
Mark G. Reid
(Articling Student)
Danielle R. Burke
(Articling Student)

The GSS/GSM is pleased to submit its preliminary budget estimates with respect to the Manitoba Hydro Cost of Service Study Methodology Review.

GSS/GSM has had the opportunity to consult with counsel for several of the other intervenors in preparing its estimates. GSS/GSM has also read the letter prepared by the Consumer Coalition and adopts and relies upon the submissions regarding the nature of this process made by the Consumer Coalition therein. GSS/GSM is a new intervenor and therefore this budget estimate reflects the hours required to consolidate the relevant stakeholders to form GSS/GSM as a participating intervenor, and the necessary research to understand GSS/GSM’s position as a new participant in these proceedings.

Counsel:

Hon. Peter S.
Morse, Q.C. (Retired)

Hon. Richard J.
Scott, O.C., O.M., Q.C.

Legal Fees Estimate

Mr. Monnin is a partner with Hill Sokalski Walsh Olson LLP who was called to the Manitoba Bar in 2002 and has significant experience directly relevant to rate regulation before the Board. Mr. Monnin will be providing services at the rate of \$190.00 per hour. Mr. Weinstein is also a partner with Hill Sokalski Walsh Olson LLP and has previously assisted Mr. Monnin with matters before the Board. Mr. Weinstein’s call to the Manitoba Bar was in 2009 and he will be providing services at a rate of \$140.00 per hour.

Task	Hourly Rate	Expected Hours	Fees Estimate
Prepare and meet with PUB counsel; Initial review and research of COSS	\$190 / \$140	60	\$19,800.00

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materials and process; Receive, review and respond to general correspondence; Liaise with PUB and other counsel; Meet with intervenors to coordinate intervention; Prepare for and attend Pre-hearing conference; Prepare budget estimate; Review prior Board Order; Review materials from prior COSS and key authorities; Review NARUC Manual; Liaise with stakeholders to form client; Research and liaise with potential experts			
Liaise with and meet with expert; Liaise with and meet with client; Review Application; Review Draft IRs; Prepare for Workshop #1	\$190 / \$140	40	\$13,200.00
Meet with expert for Workshop #1; Review IR Responses; Attend Workshop #1; Report to client and follow up to seek further instructions; Liaise with and provide instructions to expert;	\$190 / \$140	20	\$6,600.00
Liaise with expert and review expert evidence; Review evidence of other intervenors; Prepare for Workshop #2	\$190 / \$140	30	\$9,900.00
Attend Workshop #2; Report to client and review undertakings	\$190 / \$140	30	\$9,900.00
Prepare for and attend Pre-hearing Conference	\$190 / \$140	30	\$9,900.00
Prepare written submission on non-concurrent evidence	\$190 / \$140	20	\$6,600.00
Prepare cross-examination and <i>voir dire</i> ; Prepare expert	\$190 / \$140	60	\$19,800.00



REGULATION COURSE 1

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Attend oral hearing	\$190 / \$140	30	\$9,900.00
Prepare written submission on concurrent evidence	\$190 / \$140	30	\$9,900.00
Prepare oral submissions	\$190 / \$140	18	\$5,940.00
Attend submissions and deliver oral submissions	\$190 / \$140	6	\$1,980.00
Total Expected Fees	\$190 / \$140	374	\$123,420.00
Disbursements: Photocopies, courier, telephone calls, miscellaneous			\$3,000.00 - \$4,000.00
Total Fees and Disbursements exclusive of applicable taxes			\$127,420.00

Expert Evidence Estimate

GSS/GSM has retained AJ Goulding of London Economics International LLC (“LEI”) to act as its expert in this matter. Mr Goulding has extensive expertise in regulatory economics and works throughout the world providing consultancy services. Attached for the Board’s reference is Mr. Goulding’s CV, a document entitled ‘Introduction to London Economics International LLC (“LEI”)’, and a document entitled ‘London Economics International LLC’s cost causation study experience’.

Task	Expected Hours	Fees Estimate	Notes
Review of documents	32	\$11,216.00	Documents to be provided by counsel; assumes little additional research required
Review of model, plus scenario runs	40	\$14,020.00	Model provided by Manitoba Hydro, scrubbed by Daymark
Memo on treatment of expert revenues	24	\$8,412.00	Could be shared with other intervenors; relies on LEI off the shelf product
Preparation of information requests	16	\$5,608.00	Assumed to flow from review of documents



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Review of responses to IRs	16	\$5,608.00	
Workshops, including prep time	48	\$16,824.00	Assumes two workshops, and two days prep apiece
Attending hearings – concurrent evidence	60	\$21,030.00	Assumes five days of concurrent evidence and five prep days
Written submissions	32	\$11,216.00	
Follow up	24	\$8,412.00	
Contingency	24	\$8,412.00	
Total:	256	\$110,758.00	
Position	Standard Rates (US\$)	Discounted Rates (US\$)	Weight
President	\$695.00	\$495.00	25%
Senior Consultant	\$375.00	\$345.00	30%
Consultant	\$350.00	\$295.00	35%
Research Associate	\$295.00	\$200.00	10%
			\$350.50 blended rate (US\$)
Budget (US\$)			
Professional fees	\$110,758.00		
Travel and expenses	\$5,000.00		
Total:	\$115,758.00 (US\$)		

As a US-based organization with an international clientele, LEI's fees are set in US dollars. However, LEI has provided its budget estimate at a significantly discounted rate for the purpose of these hearings and there may be efficiencies created by the Board's process for these hearings that will also lead to further savings on these fees. In the event that the Board does not approve LEI's budgeted fees, GSS/GSM will need to seek out the services of an alternate expert.

GSS/GSM thanks the Board for considering its submissions on budget.

Yours truly,

HILL SOKALSKI WALSH OLSON LLP

Per: 

Christian Monnin*
CM/jm

* services provided by Christian Monnin Law Corporation

Curriculum Vitae

A.J. GOULDING

President, London Economics International LLC



February 2016

KEY QUALIFICATIONS:

In his role as president of London Economics International LLC, A.J. Goulding manages a growing international consulting firm focused on finance, economic, and strategic consulting to the energy and infrastructure industries. In addition to serving as a sector expert in electricity and gas markets, his responsibilities include project management, marketing, budget and financial control, and recruiting. A.J. also serves as an adjunct professor at Columbia University, where he teaches a course on electricity market design and regulatory economics while also supervising graduate workshops.

With over twenty years of experience in evolving electricity and natural gas markets, A.J.'s diverse background enables him to work effectively in both emerging markets and OECD countries. In North America, A.J. has been articulate in describing market relationships between wholesale power marketers, merchant plants, aggregators, and the existing investor owned utilities. In emerging markets, A.J. has considerable experience dealing with the challenges of mixed private and public ownership, difficulties in creating credit-worthy distribution and retail entities, and the realities of line losses, unreliable fuel deliveries, and politicized labor relations.

A.J. began his career performing natural gas market analysis for the ICF Resources subsidiary of ICF Kaiser International. Later, he lived for two years in New Delhi, India, where he advised the United States Agency for International Development (USAID) on electric power sector restructuring in India. He continued his work on India while pursuing his MA at Columbia University, leading to the publication of an article on Indian privatization. Simultaneously, he researched the process of power sector reform in Pakistan, contrasting it with the Indian experience. Upon completion of his MA, A.J. served as business development associate for Citizens Power LLC, a top ten US wholesale power marketer. He then moved to London Economics, where he has held roles of progressively increasing responsibility.

EDUCATION:

Earlham College, Richmond, Indiana, B.A. in Economics, 1991. College honors, scholar-athlete, public service graduate fellowship.

Columbia University, New York, New York, M.A. in International Business, 1997. Foreign Language and Area Studies fellowship, Cordier prize.

EMPLOYMENT RECORD:

From: 1996
Employer: **To:** present
London Economics International LLC, United States
President (July 1999 to present), Senior Consultant (January 1998 to July 1999), Summer Associate (June 1996 to August 1996)

From: September 2003
Employer: **To:** present
Columbia University
Adjunct Assistant Professor

From: 1997
Employer: **To:** 1997
Citizens Power LLC; Boston, MA
Associate

From: 1994
Employer: **To:** 1995
USAID; New Delhi, India
Energy Consultant

From: 1991
Employer: **To:** 1993
ICF Resources, Inc.; Fairfax, VA
Analyst

SAMPLE PROJECT EXPERIENCE:

The projects briefly described below are typical of the work A.J. has performed throughout his career at London Economics, Citizens Power, USAID/India, and ICF Resources. A.J. also serves as an adjunct professor at Columbia University, where he teaches a course in electricity market design.

Canada

- ***Ontario electricity market paper:*** on behalf of a respected Canadian think tank, LEI provided an assessment of the ways in which the Ontario electricity sector could be improved to increase economic efficiency and reduce costs for consumers over the long run
- ***submission to Ontario LTEP consultations regarding value of capacity imports:*** On behalf of a large Canadian hydropower generator, LEI analyzed the potential economic benefits of the export of capacity and energy from Quebec to Ontario. The engagement included a review of the treatment of imports in capacity markets in the Northeast, an examination of the impact on capacity prices of imports, and a discussion of the reliability benefits that long term contracts for capacity imports provide. In addition, LEI discussed how Ontario can create a level playing field for clean energy imports relative to other potential future sources of supply in Ontario
- ***provided a briefing for Alberta's Minister of Energy:*** briefings consisted of two 90 minute presentations – the first was a review of the Alberta Retail Market, and the second was a wholesale market review of ERCOT, Australia, Singapore, UK and Ontario

- ***price forecasts in key Canadian markets and associated export zones:*** provided long term electricity price forecasts in multiple engagements for key Canadian markets, including Alberta, British Columbia, and Ontario, as well as related export markets such as New York, Midwest ISO, and PJM. Results used by clients for obtaining financing and assessing contract pricing
- ***due diligence support associated with the evaluation of the possible acquisition of a minority stake in a major Ontario transmission and distribution company:*** LEI prepared reports and analysis which contributed to the analytic framework for this proposed transaction, including analysis of the regulatory framework, review of impact of PBR on revenues, strategic issues, and the potential for revenue growth.
- ***revenues to hydro portfolio in Ontario:*** for a large North American industrial company, A.J. led the creation of a market study and report underlying the issuance of income trust securities. Tasks included multiple scenario analysis of merchant revenues, review of ancillary services revenues, and an examination of the Ontario hybrid market structure
- ***assessment of role of peaking plant in Ontario power sector:*** for Ontario government body, performed extensive scenario analysis to determine extent to which peaking plant should be a part of future procurement plans in the province; this analysis included assessment of revenues from ancillary services and of optionality
- ***due diligence associated with Ontario transmission and distribution assets:*** applied detailed understanding of performance-based ratemaking concepts to advise on valuation and strategic considerations associated with a bid for the largest transmission and distribution company in Ontario
- ***valuation of Ontario generating plants, including assessment of regional electricity markets:*** organized and implemented major modeling effort to determine potential value of generation stations in Ontario. Assessed impact of transmission constraints and restructuring efforts in neighboring markets on future wholesale market prices
- ***impact of Ontario market changes on industrial consumers:*** for association of large power consumers in Ontario, assessed market trends and future entry and exit scenarios to determine long term price dynamics in the face of changes in government deregulation policies
- ***assessed potential cost of Ontario Green Energy Act:*** explored costs of Green Energy Act, including feed in tariff provisions, grid connection funding, institutional development, loss of local control, and stakeholder mandates
- ***cost of capital for regulated generating assets:*** provided expert testimony on behalf of the Ontario Energy Board regarding risk factors associated with Ontario Power Generating's prescribed assets, as well as creating a risk-return continuum on which power sector assets could be placed
- ***incentive-based contract design:*** for Ontario Power Authority, advised on provisions of power purchase agreement associated with incentives for optimization of production in peak periods for hydro facility owned by a major generator

- ***upstream capability to deliver conservation and demand management:*** for Ontario Power Authority, performed examination of capabilities of Ontario to provide necessary inputs to assure that Ontario meets its conservation and demand management targets; report incorporated into Integrated Power System Plan submission to OEB
- ***regulation of generation in Ontario:*** for Ontario Energy Board, A.J. authored paper described the ways in which legacy assets of Ontario Power Generation could be regulated, including incentive regulation and a set of regulatory contracts. Deliverables included providing technical advisory during public workshop
- ***potential for regulation of retail market auctions:*** for Ontario Energy Board, A.J. led engagement to review practice of regulatory oversight of load auctions to serve default supply across North America
- ***examination of contracting processes in Ontario:*** on behalf of the Ontario Power Authority, met with over 50 stakeholder groups to determine potential ways in which contracting process for new supply could be improved. Engagement included assessing practices in other jurisdictions and review of standard offer processes
- ***2nd generation PBR in Ontario:*** led Cdn. \$1.5 million engagement focusing on design of second generation PBR in Ontario. Key components include estimating total factor productivity (TFP), determining appropriateness of yardstick competition, analyzing demand-side management programs in the context of PBR, and examining service quality indicators
- ***market power concerns in Ontario:*** determined concentration ratios for existing configuration of generation plant, developed set of recommended portfolios to minimize market power across all timeslots in hourly market in preparation for divestiture or other market power mitigation mechanisms
- ***global generation investment strategy:*** for a major Canadian generation company, used modern portfolio theory to identify combination of asset classes and geographic locations which would result in optimal risk-reward combination for generator given its core competencies. Deliverables included interactive model to be used by generator staff on an ongoing basis
- ***design of incentive rate structure for Alberta utility:*** for a large metropolitan Alberta utility, A.J. advised on design of a proposed incentive based rate structure, including a multi-year term, operating cost incentive structure, and earnings sharing mechanism. Deliverables aided in development of regulatory filings and included testimony before the Alberta Utilities Board
- ***revenues to wind generators in Alberta:*** A.J. led the examination of merchant revenues to a portfolio of existing and under construction wind generators in the province of Alberta. Tasks included review of market design issues, 20 year scenario analysis for merchant revenues, review of contract terms and conditions, and an examination of the potential for additional revenues from the sale of emissions reduction credits and renewable energy certificates. Deliverables included market study supporting issuance of income trust units

- **reviewed Alberta Clean Energy Standard:** LEI assessed consistency of a proposed Clean Energy Standard with existing Alberta electricity market design characteristics. Paper included discussion of potential additional program attributes, indicative cost assessment, impact on investment and reliability, and assessment of further required research
- **conducted analysis of electricity system organization and governance:** LEI was retained by Nova Scotia Department of Energy (“NS DOE”) to perform analysis of the organization and governance of electricity systems both cross-jurisdictionally and within the province of Nova Scotia. The scope of work was divided into two main phases: (i) Review of international best practices and lessons learned; and (ii) Translation of best practices and lessons learned into best fit for NS.
- **comparison of Alberta delivered electricity prices with other Canadian provinces:** for a Canadian think tank, LEI provided an update of a 2011 report that compared Alberta delivered electricity prices to other Canadian provinces on a level playing field. The report was updated with new data as well as any recent developments in the market. The purpose of the report was to discuss price differences between Alberta and other Canadian provinces, breaking down the price differences into factors which do not affect economic efficiency, such as: initial endowments, reduced cost of financing due to implicit governmental backing, suppressed equity returns and tax regime differences. Findings of LEI’s analysis were presented in a workshop.
- **assisted generator in hydro development strategy:** assisted Alberta generator on strategy related to new large scale hydro development, including justification as inflation hedge for potential pension fund investors, integration into competitive market while maintaining ability to finance, and other strategic and regulatory support
- **led performance-based ratemaking project in North America:** LEI was engaged by Union to review Union’s proposed 2014 to 2018 incentive ratemaking (“IR”) plan as presented to stakeholders on April 29th, 2013 and to examine case studies of approaches to IR applied to other North American gas distribution utilities. In the case study analysis, Union particularly requested LEI to examine approaches to a set list of ratemaking parameters: productivity and X-factor trends, alternative approaches to designing an I-X framework, approaches to establishing inflation factors, approaches in other jurisdictions to applying an Earnings Sharing Mechanism (“ESM”), use of capital trackers for unknown costs, appropriateness of deferral accounts for unaccounted-for gas (“UFG”), and service quality indicators (“SQIs”) and how they are measured. LEI was subsequently requested by Union to provide comments on Union’s draft Settlement Agreement
- **review of RRO in Alberta:** London Economics International LLC (“LEI”) was asked by ENMAX Energy Corporation (“EEC”) to review EEC’s request for continuation of the practice of earning a fixed margin associated with expenses incurred as a result of operation of the Regulated Rate Option (“RRO”). For the client, LEI reviewed the settled practice in Alberta, investigated the risk of operating the RRO, and calculated an indicative range of margin for EEC

- ***review of risk management practices:*** LEI was engaged by the client to review its risk management practices and provide meaningful insights with regards to the risk management related issues. Analysis included quantification of the magnitude and probability of risks being faced, as well as research into the best practices of other similar organizations
- ***conducted Independent Evaluation review:*** LEI provided advisory services to assist the OPA in evaluations of applications made to the Aboriginal Renewable Energy Fund ("AREF") and the Aboriginal Transmission Fund ("ATF"). LEI provided advice and analysis related to the technical, financial and regulatory viability of each proposed project
- ***developed a transmission cost causation study for the Alberta Electric System Operator ("AESO"):*** the study will be used for the determination of the AESO's Demand Transmission Service Rate DTS, and is expected to be filed with AESO's 2014 tariff application to the Alberta Utilities Commission ("AUC"). The study is intended to cover four main topics: (i) Functionalization of Capital Costs; (ii) Functionalization of Operating & Maintenance ("O&M") costs; (iii) Classification of Bulk and Regional System Costs; and (iv) Implementation Considerations
- ***review of North American hydro assets:*** LEI was engaged by a large Canadian hydro generator to evaluate the potential renewable premium associated with its hydro assets in North America. LEI developed an economic model to project legacy Renewable Energy Certificate ("REC") prices in New York and New England. LEI also provided alternative methodologies such as projecting the premium based on forecasted carbon allowance prices and analyzing potential sales to large corporations on a voluntary basis
- ***analyzed current and future dynamics in the British Columbia power markets for of British Columbia power producers:*** topics analyzed included costs of independent power producers ("IPPs") relative to BC Hydro, uncertainty around future demand levels in BC, implications of moving away from use of Critical Water Year analysis in planning, risks and uncertainties regarding import availability, and the overall macroeconomic contributions of IPPs. LEI also analyzed the provincial government's Review of BC Hydro and provided an assessment
- ***assisted generator in hydro development strategy:*** assisted Alberta generator on strategy related to new large scale hydro development, including justification as inflation hedge for potential pension fund investors, integration into competitive market while maintaining ability to finance, and other strategic and regulatory support
- ***assessment of value of coal station contracts circa year 2000:*** developed analysis of value of contracts to bear costs and benefits associated with output from coal fired power stations in Alberta. Engagement involved considering only information known as of 2000, for inclusion in tax litigation case. Created pro forma valuation of the contracts as of 2000, including forecast costs and revenues, as well as opining on the appropriate cost of capital to be used
- ***workshop on performance-based ratemaking strategy:*** for first stand-alone transmission company in North America, conducted day long workshop on issues associated with PBR,

including the types of PBR and which one is most appropriate for what type of company, the sources of efficiency gains observed in other transmission companies worldwide, and the impact of performance standards on profitability and flexibility

- *development of regulatory and financing strategy for transco:* for first stand-alone transmission company in North America, evaluated key transaction parameters, assessed allowed ROE, proposed strategy for attaining favorable incentive rates, and helped to identify potential cost savings
- *recommendations regarding market power mitigation and retail market design:* in two separate engagements, advised the Government of Alberta on alternatives for rate designs for small customers and on measures to monitor, measure, and ameliorate market power; both engagements included extensive modeling of Alberta wholesale market and of retail supply tariffs
- *evaluation of rates across Canada:* reviewed rates charged to final consumers across Canada and identified distortions in rate design across provinces; performed modeling to adjust for distortions; developed appropriate calculations to appropriately compare rates across jurisdictions
- *resource adequacy mechanisms for Alberta:* worked with generators association to assess alternative approaches to assuring resource adequacy. Reviewed mechanisms for capacity and default supply procurement worldwide, developed alternatives for Alberta, and engaged in intensive stakeholder consultation
- *critiquing and improving electricity market structure in Alberta:* for market institutions and regulators in the Canadian province of Alberta, performed extensive analysis of current industry market structure, including role of Power Pool, Transmission Administrator, Market Surveillance Administrator, the Scheduling Coordinator, and the Balancing Pool. Directed detailed analysis of market power issues associated with divestiture of specific assets and advised on particular market rules to ameliorate strategic behavior

US

- *conducted review of gas transmission sector in the US:* for a European economic advisory firm, LEI reviewed the US gas transmission sector focusing on its regulatory structure. Tasks included researching the regulatory approach, legal framework, allowed capital costs and incentive mechanisms of the US gas industry
- *reviewed the US gas transmission sector focusing on its regulatory structure:* on behalf of a European economic advisory firm, an LEI team, led by AJ, reviewed the US gas transmission sector. Tasks included researching the regulatory approach, legal framework, allowed capital costs, and incentive mechanisms of the US gas transmission industry. Analysis focused on US Federal Energy Regulatory Commission ("FERC") regulatory proceedings, as well as state commission findings, related to allowed returns, capital investment requirements, and treatment of capacity
- *conducted a report on net metering programs in New Hampshire and New York:* for a private equity power sector investor, LEI conducted a report on net metering programs to

determine if the client's facilities would qualify. Project work included determining load at the sites, examination of net metering in the applicable regions, assessment of potential solar installation, exploration of installation options to determine which would be most suitable, and analyzing potential returns

- ***assessment of small hydro properties:*** as part of a retainer agreement with a growing private equity firm focused on the roll-up of small hydro properties, LEI performed a variety of supporting activities, including examination of forward markets, review of PPAs, assessment of renewable energy policies, and strategic analysis
- ***cost benefits analysis of US transmission line:*** for a utility in the northeastern US, LEI prepared a cost-benefit analysis of a proposed transmission line with the potential to change existing market arrangements. In the analysis, LEI developed a base case and multiple project cases based on different configurations of the transmission project. Using its proprietary modeling tool, POOLMod, LEI simulated energy and capacity prices in each configuration over a 15-year timeframe, and compared the price differences against various cost allocation scenarios for the transmission line's construction. LEI also tested the statistical significance of the project case results against the base case results, and conducted further analysis on the economic effects of additional renewable generation projects that construction of the transmission line would make possible
- ***revenue forecast and financing advisory for renewables acquisition:*** for newly established private equity firm, managed acquisition process for small hydro and biomass site. Process included revenue forecasting, negotiating term sheets with banks, obtaining quotes for power purchase agreements, reviewing operating agreements, and overseeing all aspects of transaction process
- ***prices for merchant generators and IPPs:*** provided expert opinion on the extent to which value of a generating station could change over a 12 to 18 month period, based on historical analysis of price changes for individual generation assets as well as for generation asset portfolios
- ***biomass investment evaluation:*** on behalf of growing private equity investor, performed extensive analysis of economics of restart of several biomass plants in California and elsewhere. Tasks included PPA review, examination of permits, assisting in arranging financing, and examination of California market dynamics
- ***advised on purchase of small hydro station:*** for a newly established hydro-focused private equity investor, valued and performed regulatory review associated with successful purchase of a small hydro facility in Maine. Tasks including creating pro forma, reviewing material contracts, negotiating purchase and sale agreement, hiring operator, and monitoring ongoing performance
- ***bid for New York City gas and oil fired stations:*** for a major financial institution, A.J. led a team of analysts in examining potential future revenues for a portfolio of peaking plants in New York City. Assignment included using proprietary models to forecast future capacity and energy revenues, and the application of real option techniques to determine value of plant flexibility

- ***bid for PJM coal-fired power station:*** worked closely with private equity fund in creating deal team, preparing first round bid, and valuation of facility, including coal supply, environmental compliance, site options, and forecast of future revenues; helped to develop second round bid, including assisting in arranging financing and risk management
- ***collateralized debt obligations (CDOs):*** led projects associated with detailed statistical analysis of the underlying economics of CDOs associated with distressed debt in the power sector, and with examining whether such a CDO could have been launched in the wake of the Enron collapse
- ***valuation of New England based generation portfolio:*** worked with potential acquirer of New England's largest generation portfolio to determine the costs of ongoing obligations associated with the portfolio, provide an understanding of long term market dynamics, and assess value of overall portfolio, including revenue forecasts and review of market rules
- ***valuation of integrated IOUs:*** coordinated evaluation effort for acquisition of Southeastern US utility and of Ontario municipal electric utility; tasks included assessment of impact of PBR, calculation of difference in profits from generation portfolio under ratebase versus in open market, and analysis of ratebase settlement
- ***valuation and regulation of LNG facilities:*** assessed potential for combination of strategically situated LNG facility with US wholesale power marketer; for separate client, advised on third party access requirements for LNG facilities in the US and relevance to potential regulatory changes in Japan
- ***review of stranded cost settlement and default supply pricing:*** prepared support for regulatory filing in Pennsylvania assessing benefits to customers from a proposal to extend recovery period for competitive transition charge while extending fixing price for default supply
- ***assessment of changes in market power for a FERC Section 203 filing:*** in connection with a proposed combination of generation portfolios, developed testimony concerning the change in market concentration as a result of the transaction, including an assessment of changes in HHIs under various market definitions
- ***review of durability of gas franchises in the face of competition:*** reviewed state regulator decisions and FERC rulings regarding sanctity of natural gas distribution franchises, assessed relevance in the face of deregulation of gas markets
- ***economic efficiency effects of retail market design:*** for major US electricity retailer, analyzed various forms of retail electricity competition and default service parameters and compared them to retail/wholesale structure in other industries to determine welfare effects
- ***strategic implications of US deregulation:*** performed in-depth study of the impact of unbundling in the US on the fundamental economics of the electric power industry at all points on the value chain; identified regional investment opportunities congruent with these dynamics
- ***market response to tax credit:*** performed in-depth analysis of impact of Section 29 tax credit for non-conventional fuels production on supply and price response in US southwestern gas markets

Europe

- ***study on transmission and distribution:*** LEI collaborated with StratOrg, a French consultancy on the development of strategic recommendations for market penetration in the US transmission and distribution markets . As part of this work, LEI and StratOrg performed a detailed analysis of the US market structure, identifying key market players and recent development, as well as barriers of entry and market opportunities for a prospective European investor. LEI travelled to Paris for an internal workshop session with Stratorg and actively participated in the final presentation of the team findings before the client's top managers.
- ***power price forecast for Balkans:*** to support potential bid to acquire nuclear station in Bulgaria, led team forecasting revenues from future spot power market sales. Issues included treatment of carbon emission credits, extent of regional integration, and availability of existing transmission capacity
- ***European renewables investment strategy:*** on behalf of a global power and real estate investment company, reviewed policies towards renewable energy in Europe and individual European companies, as well as available assets, sites, and investment climate
- ***renewables value chain investment analysis:*** for Dutch foundation based in Switzerland, examined macro trends associated with renewable energy in several major global economies, including the global supply chain from component manufacturers to installation to operation. Objective was to determine where on the renewables value chain the most profitable opportunities could be found
- ***unbundling of French state-owned vertically integrated monopoly:*** worked with leading French electricity generator and supplier to examine how to create independent profit and loss statement for its generation assets, benchmark performance against expectations, and separate revenues from plant operations from those gained through trading
- ***global regulatory review:*** assisted private equity player in assessing electricity markets in Eastern Europe, Turkey, Asia, and Latin America to determine potential regulatory and market issues associated with proposed purchase of diverse portfolio of generation, distribution, natural gas pipeline, and retail fuels businesses
- ***arguments for retaining vertical integration:*** for large French utility, reviewed cases worldwide in which during liberalization incumbents were allowed to remain active across the value chain, including retail. Our work included an assessment of the minimum competition enhancing measures regulators may require in order for the utility to continue operating in all or most of its traditional supply chain activities
- ***preparing appropriate framework for private investment in Romanian distribution sector:*** on behalf of a private client, worked with Romanian regulators to develop a consensus on approaches to capital recovery, PBR application, performance standards, supply cost-pass through, and cost of capital. These elements served as preconditions for the private investor's participation in the privatization process

Middle East

- ***developed financial, commercial, and regulatory framework, in addition to drafting an investment strategy and model for KA-CARE:*** deliverables included: (i) A master plan on how to develop renewable and atomic energies based on local value chains in Saudi Arabia; (ii) An economic framework to create a favorable environment in order to follow this master plan; (iii) An investment strategy to make use of KSA resources and available funds in an efficient way; (iv) A multitude of international case studies to avoid costly mistakes in the future and to know when to adopt; (v) A final report on 'National Policy for Investment in Alternative Energy Sources'; and (vi) Two 'sales pitch' documents for submittal to the King's Supreme Council and for the financial community
- ***advised Jordan regulator:*** advised the regulator on the weighted average cost of capital and optimal capital structure for Jordan's three distribution companies: EDCO, IDECO and JEPSCO. The recommended optimal capital structure was consistent with targeted debt service and interest coverage ratios in line with the rating methodology for distribution companies from the global credit rating agencies. Work also included identifying salient risk factors for the distribution companies, identifying appropriate local and international metrics and benchmarks, developing a usable cost of capital model, and providing training workshops for local staff
- ***cost of capital evaluation for Jordanian regulator:*** LEI was engaged by the Jordanian regulator to advise on the appropriate cost of capital to apply to the utility sector in Jordan, and to determine the optimal capital structure for Jordanian power utilities
- ***due diligence and valuation of engineering consulting firm:*** for a Middle Eastern investment fund, A.J. led the evaluation of the acquisition of an engineering consulting firm with offices in the US, Europe, and the Middle East focused on the power sector; the project included creation of a pro forma for the business, evaluation of business prospects and strategy, and an examination of the relevant economic conditions and their impact on value
- ***developed regulatory incentives in Jordan:*** examined regulatory framework in Jordan, with particular focus on creating specific regulatory incentives for distribution companies to optimize their operational expenses. Proposals envision move away from cost of service regime to incentive based structure benefiting customers and shareholders
- ***drafting National Renewable Energy Plan for Saudi Arabia:*** on behalf of the regulator, developed proposal for renewable energy plan for Saudi Arabia, including assessment of procurement methods, new institutions required, and determination of resource eligibility
- ***rate design for water and wastewater services in Saudi Arabia:*** on behalf of utility serving industrial areas in the Kingdom, examined appropriate regulatory structure and recommended approach to establishing new regulatory body, including composition of regulator, incentive structure, and tariff modeling
- ***design of wheeling tariff and pilot program for Saudi Arabia:*** for Saudi regulator, developed proposed plan for wheeling of power in Saudi Arabia, including proposed pilot program, assessment of impact on incumbent, relative economics of wheeling versus the industrial tariff, and review of associated commercial and regulatory issues

- ***tariff design for Kingdom of Saudi Arabia:*** led engagement with international team assessing tariff design, modeling, and electricity market evolution in Saudi Arabia; engagement resulted in a revised tariff system, including performance based rates, tolling agreements for generation, and an open access tariff. Included holding workshops for regulator in explaining cost of capital, tariff design, and other regulatory issues
- ***Electricity Industry Restructuring Plan for Saudi Arabia:*** A.J. developed the blueprint for industry restructuring in Saudi Arabia, including unbundling of the current monopoly vertically integrated utility, introduction of wholesale competition, and creation of a Single Buyer

Asia

- ***conducted IBR workshop in Malaysia:*** LEI was retained by the largest electric utility company in Malaysia to conduct a workshop on incentive-based ratemaking (“IBR”). The topics for the workshop include theoretical conceptual overview of IBR regulatory framework, key elements of comprehensive IBR regimes, best practices of IBR in various jurisdictions, timing and framework in other jurisdictions, how to convince regulators and stakeholders, identifying barriers to successful implementation of the IBR, and moving from first to second generation IBR, to name a few.
- ***review of rate of permitted return in Hong Kong:*** for the Hong Kong Government, LEI reviewed the rate base and the rate of permitted return for the power companies in Hong Kong under the Scheme of Control Agreements. This required reviewing the alternatives to using Average Net Fixed Assets as the rate base, examining the assumptions used and methodology to calculate the WACC of power companies, updating the indicative range for the permitted rate of return, and recommending changes to existing rates of return by identifying new international best practices
- ***examination of markets and generation asset values in Mexico, Philippines, and California:*** assisted Asian IPP in assessing generating assets in Mexico and Philippines, as well as export potential from Mexican plants to the US; mandate included developing long run marginal cost forecasts for Philippines and Mexico, and providing detailed dispatch modeling of the California market
- ***valuation of Singapore generating asset:*** on behalf of a large Asian generating company, provided revenue forecasts from spot, retail, and vesting contracts for successful acquisition of Singapore generator. Analysis included review of repowering options, assessment of regulatory evolution, assessing the relevant cost of capital, and potential for strategic behavior; A.J. later performed a similar exercise for a second Asian generating company also seeking to purchase a similar set of assets in Singapore, as well as subsequently assisting in analysis associated with refinancing of the acquisition performed by initial client
- ***advised Japanese company on potential US power sector acquisitions:*** reviewed project economics for multiple acquisition targets of Japanese investor. Tasks included providing long term revenue forecasts, reviewing motivations of sellers, providing insights on the associated market, and examining the role of hedge funds and private equity

- ***modeling future Japanese electricity market dynamics:*** for a leading Japanese financial institution, led workshop and directed the creation of an interactive model of the Japanese electric power sector. Issues addressed included quantification of plant asset values under various market scenarios, an assessment of the potential for stranded costs, review of debt coverage ratios, and exploration of the evolution of transmission assets
- ***valuation of generation and distribution assets in Philippines and the Caribbean:*** provided detailed analysis of regulatory trends in the Philippines and in selected Caribbean countries. Used regulatory filings, PPAs, and public information to develop a value for generation and distribution assets in these markets. Advised potential buyer on relative risk in each country examined, including country risk, regulatory risk, and fuel supply and load growth issues
- ***assessment of plant pro formas and underlying market environment in six Asian countries:*** for leveraged buyout of major global IPP developer, assessed plant financial models, state of reform efforts, and potential for unbundling in Bangladesh, China, India, Philippines, Thailand, and Turkey
- ***assessment of US natural gas storage business:*** for a large Japanese gas utility, examined trends in regulation and investment in the US natural gas storage business. Engagement included comparison of natural gas storage business risks to that of IPP investment
- ***distressed asset acquisition strategy:*** advised a major Japanese utility on entry strategies to the US market, including performing a workshop on due diligence, US regional market analysis, and asset valuation; arranging for introductions to major asset sellers, potential investment partners, and advisors; and creating a screening methodology and database of potential acquisition targets
- ***business development opportunities in India:*** for UK electricity and mining conglomerate, provided detailed assessment of opportunities in construction of integrated mining and mine-mouth power stations and in distribution of electricity
- ***assessed retail margin review for generator in India:*** reviewed retail margins on electricity sales worldwide, in order to provide Indian generator insight with regards to appropriate retail margins that could be charged to selected customers in one Indian jurisdiction. Engagement involved review of case studies of electricity retail margins around the world, including the US, UK, and Australia. In addition, retail margins in other industries were reviewed, along with the progression of margins as an industry progresses from infancy to maturity
- ***recommendations for next Scheme of Control in Hong Kong:*** worked with the Hong Kong government to develop a series of recommendations regarding appropriate allowed returns, calculation of asset base, prevention of over-investment, and rate stability
- ***lessons from North American experience for Chinese regulators and grid companies:*** for a set of Chinese state-owned companies, including grid operators, the nuclear operating company, and provincial power companies, London Economics International LLC prepared a series of detailed briefings on developments in electricity market design worldwide, with a particular emphasis on lessons from the North American experience. This experience was

then used to highlight the various alternatives for market design in China, and the potential outcomes

- ***implications of restructuring the Japanese power sector:*** for a major Japanese development bank, we analyzed the impact of proposed reforms on a Japanese transmission and generation company, including the potential for stranded costs, opportunities for expansion of transmission, and future tariff setting regimes. The engagement included extensive training of the development bank's staff, as well as the creation of a working model of the Japanese power sector
- ***institutional development for IPP promotion:*** contributed to Indian private power promotion efforts through technical assistance program to state electricity boards, central government agencies, and private firms, with particular emphasis on role of PURPA in creating US IPP industry
- ***bagasse cogeneration:*** worked extensively with Indian sugar mills, equipment suppliers, government investment promotion agencies, and state electricity boards to develop cost-effective targeted loan and technical assistance program to promote bagasse cogeneration
- ***barriers to introduction of new coal combustion technologies in emerging markets:*** served as liaison between India's National Thermal Power Corporation (NTPC) and US research institutions to assess ways to adapt US coal combustion technologies to Indian conditions

Latin America & Africa

- ***Colombia Market overview and revenue forecasts for target assets:*** LEI was hired by an electric operator for the purposes of valuing a portfolio of generating assets in Colombia. LEI's scope of work consists of a comprehensive review of the Colombia energy market (including fuel and power market drivers), describe in details the functioning of both wholesale power market and firm energy market (capacity market), develop forecasts of spot prices in order to derive expected revenues for the portfolio. Colombia being a hydro dominated system, as part of its modeling exercise, LEI ran a Monte Carlo simulation to develop a series of probabilities associated with generation profiles of Colombia's hydro resources to reflect the impact of weather conditions and water inflows on hydropower plants' output. LEI summarized its research and modeling results in a final report that was presented to lenders and other interested parties.
- ***conducted feasibility study in Morocco:*** as part of a consortium, London Economics International ("LEI") was hired by the USTDA to perform a feasibility study for the development of a 5 MW solar Photovoltaic ("PV") pilot project in Essaouira (Morocco). LEI led the developmental impact assessment of the project and performed economic and financial analyses in order to evaluate the viability of the project and its impact on the local and regional economy. LEI provided support to the engineering team throughout the study by performing a detailed review of Morocco's existing regulatory framework to evaluate its impact on the project financing structure and development. A portion of LEI's work consisted of investigating Morocco's public procurement rules and draft a request for proposal for the design and the construction of the pilot project, in compliance with Morocco's requirement

- **market briefing on renewables in El Salvador:** LEI was engaged by a private equity firm focused on small-scale renewable energy projects considering expanding into South America to develop a market briefing on El Salvador, focused on the challenges and opportunities in developing small hydro projects in the country
- **cost of capital and forecasting for Bolivian distributor:** LEI provided inputs into the valuation of a Bolivian distribution company, including developing the cost of capital; assessing demand, cost, and tariff forecasts; and reviewing the overall cash flow model. LEI also reviewed the company's historical performance relative to efficiency and performance targets
- **evaluation of wholesale generation market:** on multiple occasions for different clients, AJ designed and oversaw the analysis of wholesale generation market in Mexico. Tasks included review of power purchase agreements, assessment of long run marginal costs, explicit modeling of the current system, and a review of the regulatory framework in Mexico for generation. In addition, AJ also advised clients on opportunities to enter the natural gas sector in Mexico
- **performed tariff review for Argentina's electricity regulator:** undertook tariff review of a large Argentinean utility for the regulator Ente Nacional Regulador de la Electricidad ("ENRE"). Work included evaluating the performance of the utility over the previous tariff period; advising ENRE on international best-practice design of distribution tariffs; proposing a tariff setting methodology for the forthcoming tariff period and new tariff levels; providing technical assistance to ENRE; and assisting ENRE during public hearings on the proposed tariffs
- **implications of performance based ratemaking (PBR) in the Caribbean:** for a privately owned integrated electric company based on a well developed Caribbean island, directed strategic analysis of implications of PBR, suggested approach to regulators, and provided indicative benchmarking analysis
- **advisory services on the development of a 75 MW hydroelectric power plant in Cameroon:** under a USTDA contract, AJ Goulding will act as a Senior Energy Market Specialist in the LEI portion of the work for a consortium to provide financial and technical advisory assistance to the Ministry of Energy and Water Resources of the Government of Cameroon with respect to the development of a 75 MW hydroelectric power plant at Bini à Warak. Specific tasks include review of Cameroon's existing regulatory system, regional market demand analysis and assessment of developmental impact of the project

Written and oral expert testimony

Note: expert testimony was also a component of some projects listed above, particularly regulatory projects for Ontario Power Authority, Ontario Energy Board, and involving incentive rates in Alberta.

- **review of valuation metrics used in conjunction with tax payment challenge for an Alberta generator:** assessed the appropriateness of valuations utilized to determine depreciation deductions related to the acquisition of a coal-fired generating station. Engagement also

required creating forecasts that would have been appropriate at the time the acquisition was made several years previously, as well as calculating asset values using multiple valuation approaches. Multiple forecasting tools were used. Engagement included developing critiques of work by opposing expert witnesses

- ***examination of Swiss electricity market:*** for a US financial institution, A.J. reviewed the development of the Swiss electricity market and specifically the position of hydro stations within that market. Analysis included a discussion of the factors that influence the value of hydro stations, presence of foreign owners in the Swiss electricity market, and use of post-tax cash flow to evaluate potential investments
- ***analysis of potential customer impacts due to holding company acquisition of merchant generator:*** discussed ways in which customer rates would be impacted by potential credit rating downgrades of regulated subsidiaries due to holding company parent's acquisition of merchant generator; engagement included examination of impact on default supply as well as reliability
- ***assessment and valuation of quantum merit claims:*** for advisor and developer of biomass facilities, provided expert opinion on value of services provided based on industry knowledge, review of correspondence, and experience providing or commissioning similar services
- ***conservation and demand management (C&DM) in Ontario:*** wrote testimony related to the alternative ratemaking approaches available regarding C&DM; addressed innovative alternatives and compared and contrasted various schemes in the Ontario context
- ***review of Dutch electricity market regulatory dynamics:*** in a case before the US Federal Court of Claims related to economic substance, provided understanding of how Dutch electricity market was structured in the mid-1990s, how it was expected to evolve, and how it did actually evolve. Issues addressed included market structure, regulation, role of non-utility investors, and role of private and international investors
- ***valuation of PPAs associated with IPPs in Thailand:*** as an expert witness in an arbitration case, A.J. quantified the change in value resulting from modifications to several PPAs associated with a power project in Thailand. Engagement included review of PPAs, evaluation of Thai power sector restructuring process, extensive modeling of financial aspects of PPAs, and assessment of financing alternatives; client won on all claims
- ***supported client's transmission FBR reopener application:*** in particular, the client wanted LEI to support their argument (i) to amend the G factor calculation to eliminate the G-factor lag effective January 1, 2011 and (ii) to reduce EPC's current X factor of 1.2% to 0.0%. LEI provided support throughout the whole litigation proceeding by responding to information requests which involved additional research and analysis, including synthesis of publications on recent technological advances in electricity transmission sector, and updating the Ontario LDCs TFP model to ten years

PUBLICATIONS:

- Goulding, A.J. "A New Blueprint for Ontario's Electricity Market." C.D. Howe Institute. Commentary No. 389. September 2013.
- Goulding, A.J. and Serkan Bahçeci. "Stand-by rate design: Current issues and possible innovations." *Electricity Journal*, June 2007, pp 87 - 96.
- Goulding, A.J. and Bridgett Neely. "Picture of a Stalled Competitive Model" *Public Utilities Fortnightly*, February 2005, pp 35 - 42.
- Goulding, A.J. and Bridgett Neely. "Acceding to Succeed" *Public Utilities Fortnightly*, July 2004.
- Goulding, A.J. "Let's Get This Party Started: Why Ontario needs a competitive market" *Public Utilities Fortnightly*, May 2004, pp 16 - 20.
- Goulding, A.J. and Nazli Z. Uludere. "Uncovering the *true value* in merchant generation" *Electricity Journal*, May 2004, pp 49-58.
- Goulding, A.J. "On the Brink: Avoiding a Canadian California" *Public Utilities Fortnightly*, February 5, 2003.
- Goulding, A.J., Julia Frayer, Jeffrey Waller. "X Marks the Spot: How UK Utilities Have Fared Under Performance-Based Ratemaking" *Public Utilities Fortnightly*, July 15, 2001.
- Goulding, A.J., Julia Frayer, Nazli Z. Uludere. "Dancing with Goliath: Prospects After the Breakup of Ontario Hydro" *Public Utilities Fortnightly*, March 1, 2001.
- Goulding, A.J., Carlos Rufin, and Greg Swinand. "Role of Vibrant Retail Electricity Markets in Assuring that Wholesale Power Markets Operate Effectively." *Electricity Journal*, December 1999.
- Adamson, Seabron and A.J. Goulding. "The ABCs of Market Power Mitigation: Use of Auctioned Biddable Contracts to Enhance Competition in Generation Markets." *Electricity Journal*, March 1999.
- Goulding, A.J. "Retreating from the Commanding Heights: Privatization in an Indian Context." Columbia University: *Journal of International Affairs*, Winter 1997, pp. 581-612.
- Hass, Mark R. and A.J. Goulding. "Impact of Section 29 Tax Credits on Unconventional Gas Development and Gas Markets." Society of Petroleum Engineers: SPE 24889, presented at 67th Annual Technical Conference, Washington, DC, October 6, 1992.

SPEAKING ENGAGEMENTS:

- "What's Next for Ontario's Electricity Market?" Panelist, C.D. Howe Institute Roundtable, Toronto, Ontario, Canada, September 16th, 2014.
- "Prices and Costs, Why Rates Don't Tell the Whole Story" Speaker, Making Markets Work Symposium - Manning Centre, Calgary, Alberta, Canada, June 25th, 2014.
- "Examining the Future Structure of Ontario's Electricity Market: Should Ontario Incorporate a Capacity Market or Alternative Structural Framework?" Panelist, Ontario Power Conference, Toronto, Ontario, Canada, April 15th, 2014.

- "Electricity Prices – Economics, Public Policy, Technologies and Affordability"*** Panelist, CCRE Energy Leaders Roundtable, Hockley Valley Resort, Orangeville, Ontario, Canada, March 27th, 2014.
- "Priorities for enhancing Ontario's electricity market: What direction forward?"*** Panelist, APPrO, Toronto, Ontario, Canada, November 20th, 2013.
- "Evolving Regulation in Ontario: Best Practices from Other Jurisdictions"*** Panelist, Ontario Energy Association's ENERGYCONFERENCE13, Toronto, Ontario, Canada, September 11th, 2013.
- "Points to consider when valuing hydro in the US"*** Speaker, HydroVision 2013, Denver, Colorado, US, July 26th, 2013.
- "Pricing Power in Ontario: Perspectives and Competitive Analysis on the Future Direction of Ontario Electricity Rates"*** Panelist, Ontario Power, Toronto, Ontario, Canada, April 17th, 2013.
- "Why Alberta is Still Standing"*** Panelist, Independent Power Producers Society of Alberta's 19th Annual Conference – Last Market Standing?, Alberta, Canada, March 11th, 2013.
- "Market Evolution in the context of the EMF and the post-election environment"*** Panel Moderator, Association of Power Producers of Ontario, Toronto, Ontario, Canada, November 16th, 2011.
- "Green Energy Economics"*** Panelist, Electricity Distributors Association's ENERCOM, Toronto, Ontario, Canada, March 30th, 2011.
- "Projected Supply-Demand Balance in Ontario: A Call to Inaction"*** Speaker, APPrO, Toronto, Ontario, Canada, November 18th, 2010.
- "Changes in electricity policy: what will it cost?"*** Speaker, 2010 Ontario Energy Association Annual Conference, Niagara Falls, Ontario, Canada, September 21st, 2010.
- "Energy Infrastructure Spending"*** Debate Panelist, Canadian Association of Members of Public Utility Tribunals (CAMPUT), Montreal, Ontario, Canada, May 5th, 2010.
- "Strategic implications of the Ontario Green Energy Act"*** Presentation to Ontario Energy Association Green Energy and Conservation Joint Sector Committee, Toronto, Ontario, Canada, June 24th, 2009.
- "Strategic implications of evolution of North American utilities sector in response to environmental initiatives"*** Presentation to Mitsui Canada Leadership Forum, Toronto, Ontario, Canada, June 17th, 2009.
- "Making retail competition work in electricity"*** Speaker, Illinois Commerce Commission Retail Competition Workshop, Chicago, Illinois, US, October 2nd, 2006.
- "Gods and monsters: the role of the Ontario Power Authority in Ontario's hybrid market"*** Speaker, Ontario Energy Association annual conference, Niagara Falls, Ontario, Canada, September 14th, 2005.

- "Transmission investment in today's power markets: key considerations"* Presentation to the Wyoming Infrastructure Authority, Casper, Wyoming, US, May 26th, 2005.
- "The true cost of power: comparing rates for power across Canada"* Speaker, Independent Power Producers Society of Alberta conference, Banff, Alberta, Canada, March 15th, 2005.
- "Key considerations with regards to resource adequacy mechanisms in Alberta."* Speaker, Independent Power Producers Society of Alberta luncheon, Calgary, Alberta, Canada, November 3rd, 2004.
- "Finding the silver lining: investment opportunities in Canadian power markets"* Speaker, 2004 Canada Power Conference, Toronto, Ontario, Canada, September 30th, 2004.
- "Adding value for the shareholder: Managing small utilities in a period of regulatory change."* Speaker, Ontario Electricity Distributors Association, London, Ontario, Canada, June 8th, 2004.
- "Case studies in electricity market design: learning from experience."* Guest lecturer, Columbia University Center for Energy and Marine Policy graduate program, International Energy Systems and Business Structures class, New York, New York, US, April 8th, 2003.
- "'The grass is always greener' vs. 'All of your eggs in one basket': investment outlook for California and foreign markets."* Speaker, Platt's Global Power Markets Conference, New Orleans, Louisiana, US, March 31st, 2003.
- "Transmission congestion, valuation, and investment issues in the region surrounding Ontario."* Speaker, Canadian Institute conference on Inter-jurisdictional Power Transactions, Toronto, Ontario, Canada, April 8th, 2002.
- "Update on new generation development in Alberta."* Speaker, Canadian Institute Conference on Managing Electricity Price Volatility in Alberta, Calgary, Alberta, Canada, February 27th, 2002.
- "The Alberta market structure and implications of structural change."* Speaker, Insight Conferences Alberta Power Summit, Calgary, Alberta, Canada, February 22nd, 2002.
- "Implications for developers of key aspects of competing Midwest ISO designs."* Speaker, INFOCAST conference on Maximizing the Value of QFs and IPPs, Orlando, Florida, US, February 1st, 2001.
- "Risk and rewards from PBR for US utilities: lessons from overseas."* Speaker, UTECH 2000 conference, St. Petersburg, Florida, US, November 30th, 2000.
- "Dancing with Goliath: increasing competition in Ontario wholesale generation market."* Speaker, Canadian Independent Power conference, Toronto, Ontario, Canada, November 27th, 2000.
- "Asset valuation in evolving global power markets."* Speaker and case study facilitator, World Bank conference on Emerging Issues in the Power Sector, Washington, DC, US, April 19th-21st, 2000.

"Overseas exposure: is it worth the risk?" Speaker at Global Power Markets Conference, organized by Global Power Report and McGraw-Hill, New Orleans, Louisiana, US, April 16th -19th , 2000.

"Profiting from retail: challenges for MEUs." Speaker at conference on buying and selling electric utilities in Canada, organized by IBC USA conferences, Toronto, Ontario, Canada, November 15th-17th, 1999.

"Assessing the US electricity market and evaluating US targets." Facilitator for workshop on US acquisition opportunities for European energy firms, organized by IIR Limited, London, England, February 9th-11th, 1999.

LONDON ECONOMICS INTERNATIONAL LLC

INTRODUCTION TO LONDON ECONOMICS INTERNATIONAL LLC ("LEI")

LEI is a global economic, financial, and strategic advisory professional services firm specializing in energy, water, and infrastructure. The firm combines detailed understanding of specific network and commodity industries, such as electricity generation and distribution, with sophisticated analysis and a suite of proprietary quantitative models to produce reliable and comprehensible results.

The firm also has in-depth expertise in economic and financial issues related to the electricity, gas, and water sectors, such as asset valuation, procurement, regulatory economics, and market design and analysis. LEI has worked extensively in North America, Europe, Asia, Latin America, Africa, and the Middle East, and has a comprehensive understanding of the issues faced by the utilities and regulators alike.

The following attributes make LEI unique:

- *clear, readable deliverables* grounded in substantial topical and quantitative evidence;
- *internally developed proprietary models* for electricity price forecasting incorporating game theory, real options valuation, Monte Carlo simulation, and sophisticated statistical techniques;
- *balance of private sector and governmental clients* enables LEI to effectively advise both regarding the impact of regulatory initiatives on private investment and the extent of possible regulatory responses to individual firm actions;
- *ability to estimate relative efficiency levels* and efficiency frontiers provides expertise to advise on network tariffs and design rates under performance-based ratemaking; and
- *worldwide experience* backed by multilingual and multicultural staff.

LEI has significant experience in several areas, including:

ELECTRICITY: London Economics International LLC has participated in the birth and development of competitive electricity markets worldwide. Our strategy practice has helped traditional IOUs in the creation of competitive gencos, assessment of the establishment of independent transcos, and valuation of synergies with associated businesses. Market design achievements include use of game theoretic techniques to assess bidding strategy and creation of sophisticated contracting structures to mitigate market power.

WATER: LEI's water and wastewater, and collection system sector services include advising on water utility management, tariff rate-setting and regulatory frameworks, PBR, water demand management programs, and freshwater supply, treatment and distribution systems. LEI has advised water and wastewater industry clients ranging from power and water utilities to government regulators and financial institutions in Europe, Africa and the Middle East.

NATURAL GAS: LEI's natural gas related activities include assessment of the synergies between the natural gas and electric power industries, examination of performance-based ratemaking and total factor productivity for natural gas distribution companies, and developing screening methodologies for potential investments in the natural gas industry.

RENEWABLES: LEI provides a range of services associated with the renewable energy industry. This includes working with developers to value potential revenue streams from renewable energy credits (RECs) and/or emissions offsets, advising private equity funds to craft investment plans targeted at "green" technologies, and counseling governments and regulators on creating policies which efficiently incentivize investment in renewable energy.

TRANSPORTATION: London Economics is at the forefront of analyzing key issues related to pricing and privatization of key transportation infrastructure. This includes analysis of the implications of road pricing, regulation and development of privatized ports, and lessons from the UK rail privatization process.

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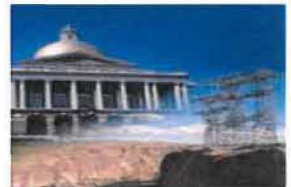
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CONSULTING



TRANSMISSION



RENEWABLE ENERGY



PROCUREMENT

CANADIAN MARKET EXPERIENCE

London Economics International LLC (LEI) has extensive experience analyzing Canadian energy markets. We have worked across Canada, from Vancouver to St. John's. Our clients include both private sector companies and regulatory institutions, and both Canadian and foreign companies. We have performed a number of engagements related to the dynamic market environments such as those found in the provinces of Alberta and Ontario, and are knowledgeable about developments in both electricity and natural gas trading.

HOW WE CAN HELP

MARKET DESIGN: LEI has worked on a variety of issues related to market design and Independent System Operator (ISO) formation. In Ontario, we have advised clients on issues surrounding the Global Adjustment, Standard Service Supply Code, as well as reviewing the activities of the Market Design Committee. In Alberta, we were responsible for the initial proposed contractual structure which addresses market power without forcing divestiture. These Auctioned Biddable Contracts (ABCs) have since been used elsewhere to address similar situations. We also led the Industry Structure Review, in which we recommended revisions to the market design there. We have also worked extensively with both the Alberta Electric System Operator (AESO) and the Ontario Independent Electricity System Operator (IESO).

WHOLESALE GENERATION MARKETS: Extensive experience modeling wholesale generation markets across North America and around the world provides LEI with a detailed understanding of electricity price dynamics. Our long-term price forecasts for Ontario have been incorporated into analysis underpinning several asset purchases, including successful bids for the Bruce nuclear assets and for the Mississagi hydro-electric assets. In Alberta, our model of strategic bidding capabilities was used to determine the impact of the sale of Auction Biddable Contracts on an incumbent's portfolio. In depth experience with the dynamics of neighbouring US markets helps us to design highly relevant scenarios for modeling Canadian markets; use of our proprietary marginal cost based and strategic bidding models ensures that fundamental aspects of system dynamics are appropriately represented. Application of real options models assures that flexibility in peaking plants is also appropriately valued.

DISTRIBUTION VALUATION: Our comprehensive knowledge of performance based ratemaking (PBR) regimes around the world gives us unique capabilities in valuing natural gas and electricity network assets in evolving regulatory environments like those found in Alberta and Ontario. LEI advised the Ontario Energy Board on second generation PBR and the Coalition of Large Distributors on third generation PBR. Our valuation techniques are enhanced through our ability to recognize hidden assets such as telecommunication rights, and value them. In addition we have acquired in-depth knowledge of sophisticated leasing and swap transactions used in a number of European network financings which are relevant to Canada.

REPRESENTATIVE CLIENTS

Alberta DOE
AltaLink
AMPCO
Brookfield Renewable Power
British Energy
Coalition of Large Distributors
ENMAX
Hydro Quebec
Ontario Energy Board
Ontario IESO
Ontario Power Authority
Pension Funds
Power Pool of Alberta
Scotia Capital
SNC-Lavalin
Toronto Hydro
TransAlta



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London Economics International LLC's cost causation study experience

prepared by London Economics International LLC (LEI)



February 2016

This document lists London Economics International LLC's ("LEI") experience with cost causation studies. LEI has conducted cost causation studies in the past along with counseling governments and regulators to design tariffs that allocate costs in an economically efficient manner.

Transmission cost causation study for the Alberta Electric System Operator ("AESO"): The study was used for the determination of the AESO's Demand Transmission Service Rate DTS, and was filed with AESO's 2014 tariff application to the Alberta Utilities Commission ("AUC"). The study covered four main topics: (i) Functionalization of Capital Costs; (ii) Functionalization of Operating & Maintenance ("O&M") costs; (iii) Classification of Bulk and Regional System Costs; and (iv) Implementation Considerations.

Self-funding tariff for ISO New England including cost causation study: LEI provided support for ISO New England throughout the design and submission to FERC of ISO New England's self-funding tariff. LEI first defined the basic underlying economic principles for specifying the tariff, then undertook to show how the tariff should be applied to various system users. The engagement involved an intensive financial modeling effort, frequent interaction with stakeholders, and written testimony before FERC.

Economic advice on cost causation and tariff regime: LEI provided Australia's former power market regulator, NEMMCO, economic advice on the appropriate regime for charging market participants for the costs incurred by the client in providing its services, in accordance with the National Electricity Code. In making its recommendation on participant fees, LEI considered the criteria specified by the National Electricity Code. LEI also considered the issues and arguments raised in submissions provided by participants in response to the issues paper released in December 1999.

Methodologies for transmission cost allocation: LEI advised a state public utilities commission on methodologies for transmission cost allocation by comparing and contrasting alternative planning approaches and pricing models employed within the US and one international jurisdiction, the United Kingdom. The final report provided a 'strawman' recommendation for an effective cost allocation methodology.

Distribution cost allocation and customer class definition: LEI, in consortium with an engineering firm, analyzed the customer density and distribution service costs for one of Ontario's largest utility. This engagement had three specific objectives: (i) evaluate the relationship between customer density and distribution service costs; (ii) assess whether utility's existing density-based rate classes and density weighting factors appropriately reflect this relationship; and (iii) consider, qualitatively, the appropriateness and feasibility of establishing alternative customer class definitions.

Cost of service tariff design for electricity, water and wastewater services in Saudi Arabia: On behalf of a utility serving industrial areas in Saudi Arabia, LEI developed a regulatory framework for power and water utilities not regulated by the government, developed a charter for a new regulatory body, established and recommended cost of service (and alternative incentive regulation) based tariff structure and accompanying tariff model for all business activities, and assisted filing of tariff petitions with the applicable regulatory authorities for approval.

Design of wheeling tariff and pilot program for Saudi Arabia: For the Saudi regulator, developed proposed plan for wheeling of power in Saudi Arabia, including proposed pilot program, assessment of impact on incumbent, relative economics of wheeling versus the industrial tariff, and review of associated commercial and regulatory issues.

Tariff design for Kingdom of Saudi Arabia: Led engagement with international team assessing tariff design, modeling, and electricity market evolution in Saudi Arabia; engagement resulted in a revised tariff system, including performance based rates, tolling agreements for generation, and an open access tariff. Included holding workshops for regulator in explaining cost of capital, tariff design, and other regulatory issues.