



August 18, 2020

Kathryn H. Bowman  
Louisiana Public Service Commission  
Office of Executive Counsel  
602 North Fifth Street (Galvez Building) (70802)  
P.O. Box 91154  
Baton Rouge, Louisiana 70821-9154

Re: Notice of Intent to Conduct Request for Proposals for Power Purchases Contracts and/or Generating Capacity Pursuant to the LPSC's Market Based Mechanism ("MBM") Order

Dear Ms. Bowman:

Please find attached London Economics International's ("LEI") proposal to act as an outside consultant and assist Louisiana Public Service Commission ("LPSC") in the review of Southwest Louisiana Electric Membership Corporation, Concordia Electric Cooperative, Inc., and Pointe Coupee Electric Membership Corporation's (collectively "Co-ops") Notice of Intent to Conduct Request for Proposals ("RFP") for Power Purchases Contracts and/or Generating Capacity, subsequently issued RFP, and any subsequent certification proceeding of any resources selected out of the RFP filed by the Co-ops.

LEI is uniquely qualified for this role, given its extensive experience in competitive procurement processes, having designed, optimized, and managed procurement processes for regulators, governments, industrials, and utilities around the world. Moreover, LEI has extensive knowledge of electricity markets of the Midcontinent Independent System Operator region, having performed a broad range of services from asset valuation to price forecasts to procurement projects in the region over the last two decades.

There are no actual or potential conflicts of interest for LEI in performing the contractual obligations contemplated in this RFP. LEI is currently engaged as technical consultant in the audit of Fuel Adjustment Clause filings by Cleco Power LLC and Entergy Louisiana LLC, and in the matter of the LPSC Rulemaking to Study Renewable Energy Tariff Options (Docket No. R-35423). There are no other engagements with any other Louisiana state entity, utility and/or investors in utilities operating in Louisiana, or any of their subsidiaries. To our knowledge, we are not advising, nor have a financial interest in, any potential bidders in a future competitive procurement for major resources in Louisiana.

If you have any follow-up requests or questions with respect to this submission, please do not hesitate to reach out to me at the contact information below.

Sincerely,

Marie N. Fagan, PhD  
Chief Economist T: (617)-933-7205, E: [marie@londoneconomics.com](mailto:marie@londoneconomics.com)

# Proposal to serve as the outside consultant to Louisiana Public Service Commission’s review of Southwest Louisiana Electric Membership Corporation, Concordia Electric Cooperative, Inc., and Pointe Coupee Electric Membership Corporation’s Notice of Intent to Conduct Request for Proposals for Power Purchases Contracts and/or Generating Capacity



*prepared for the Louisiana Public Service Commission by London Economics International LLC*

**August 18, 2020**

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*London Economics International LLC (“LEI”) is pleased to submit this proposal to the Louisiana Public Service Commission (“LPSC”) to assist with providing professional, technical consulting services to help LPSC with the review of Southwest Louisiana Electric Membership Corporation, Concordia Electric Cooperative, Inc., and Pointe Coupee Electric Membership Corporation’s Notice of Intent to Conduct Request for Proposals for Long-Term Power Purchases Contracts and/or Generating Capacity, subsequently issued RFP, and any subsequent certification proceeding of any resources selected based on the RFP filed by the Co-ops.*

*LEI is a leading energy consulting firm that has advised regulators and utilities on system planning issues, including evaluation of supply options, renewable integration, and long-term analysis of the sector development and evolution. The firm possesses over 20 years of experience advising regulators, electric and natural gas utilities, private firms, and specific customer classes across Canada and the United States as well as among international jurisdictions. LEI is exceptionally well-qualified to serve the LPSC because of four distinct and valuable areas of expertise: (i) LEI has direct experience serving as a technical consultant/independent evaluator of utility RFPs for energy supply, (ii) LEI understands the regional power market and challenges for MISO participants, (iii) LEI has extensive in-depth modeling and analytical capabilities, and (iv), LEI understands the unique perspective and objectives of state regulators. LEI has worked with other regulators and has experience testifying on a variety of issues related to procurement, competitive markets, long term planning issues, and cost-benefit considerations.*

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# 1 Bidder Information

London Economics International LLC (“LEI”) is a US-owned and operated 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, transmission and distribution, and retail markets with sophisticated analysis and a suite of proprietary quantitative models that together produce reliable and comprehensible results. LEI’s array of clients extends from the private sector to market and government institutions.

Figure 1. Selected LEI clients throughout the world



The following attributes make LEI unique:

- *clear, readable deliverables that are grounded in substantial topical and quantitative evidence;*
- *internally developed proprietary models for electricity price forecasting (energy, capacity, RECs, GHG credits, etc.) that incorporate a detailed assessment of fundamentals, game theory, real options valuation, Monte Carlo simulation, and sophisticated statistical techniques;*
- *a balance of private and public sector 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; and*

- *worldwide experience* backed by a multilingual and multicultural staff.

## 1.1 Background and staffing

LEI is extremely well-qualified to serve as a technical consultant to the LSPC. LEI has direct experience serving as a technical consultant/independent evaluator (“IE”) of utility resource procurements in other jurisdictions; LEI understands the regional power market and challenges for MISO participants; LEI has extensive in-depth modeling and analytical capabilities; and LEI understands the unique perspective and objectives of state regulators, having worked with many regulators. LEI has experience testifying on a variety of issues related to procurement, competitive markets, long term planning issues, and cost-benefit considerations.

- **Extensive experience as a technical consultant or independent evaluator/monitor in a competitive procurement, utility RFP process, or resource acquisition activity in deregulated power markets.** LEI has worked on energy procurement issues for wholesale market participants and regulators and has a comprehensive mastery of the entire procurement process, from the initial phases of design and stakeholder consultation, through qualification, implementation, and bid evaluation. The firm’s work in procurement process design and analysis spans the spectrum of wholesale and retail products and includes engagements on unit-contingent contracts, energy-only block products, renewable energy certificates, full requirements service, stand-alone capacity products, energy-related instruments, and new-build generation assets.
- **Expertise and experience in the MISO regional wholesale power market.** LEI has an in-depth knowledge of the supply-demand dynamics of the region’s electricity markets and has access to a comprehensive set of power markets data that the firm routinely incorporates in its analyses, e.g., an assortment of third-party commercial databases (SNL Financial), EPA CEMS data, FERC EQRs, and bilateral pricing market data. LEI is aware of the challenges and issues that are prevalent in Louisiana and MISO as the firm has been involved in several engagements in the region.
- **Experience deploying our proprietary production cost-based simulation model to forecast electricity prices.** LEI has over two decades of experience conducting independent forecasts of energy prices and system dispatch using simulation modeling techniques and other analytics for power market analysis, cost-benefit studies, the examination of local macroeconomic impacts from investment spending in-state, integrated resource planning, and resource adequacy. The firm also has an in-depth knowledge of utility self-build options and approaches for analyzing them impartially and comparing them to third-party options.
- **Experience in supporting regulators in important wholesale power market strategies and/or utility resource RFP processes, including the provision of written and oral expert witness testimony.** LEI has extensive experience in advising on RFP design, and power purchase and financial agreements, including providing expert testimony in cases relating to the procurement of resources and other matters. LEI’s experience allows it to

understand both the supply as well as the procurement side, which enables the firm to easily anticipate and prevent problems in the procurement process.

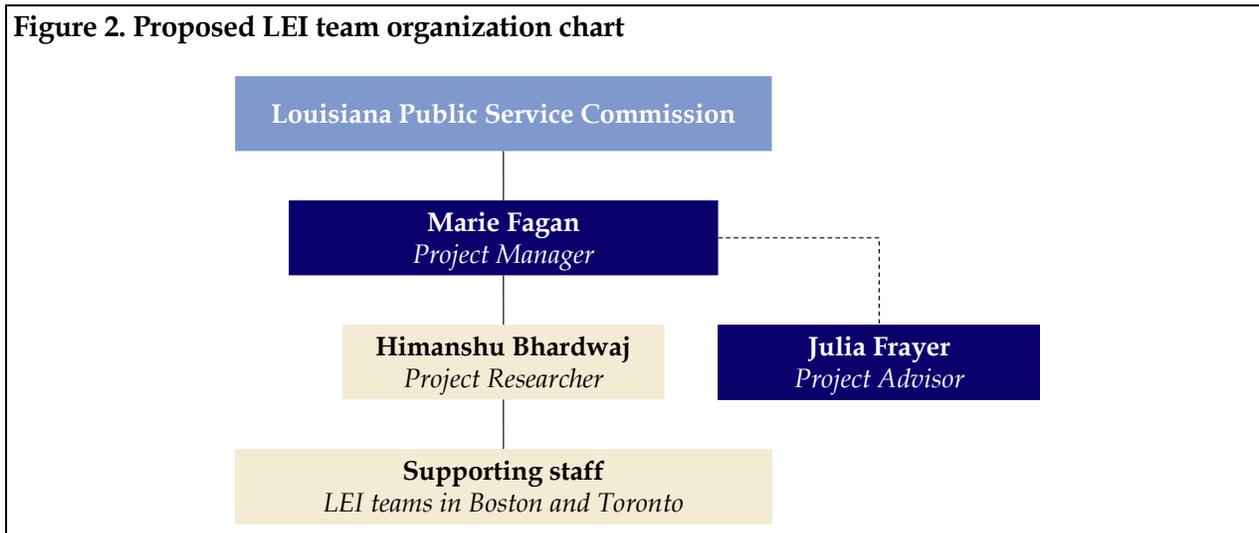
Based on the requirements of the engagement, LEI has gathered a select team of talented and dedicated professionals with the required qualifications to assist LPSC in the review of Notice of Intent to Conduct Request for Proposals for Long-Term Power Purchases Contracts and/or Generating Capacity, the subsequently issued RFP, and any subsequent certification proceeding of any resources selected from the RFP filed by the Co-ops. The team possesses considerable independent assessment expertise, analytical and technical capabilities, and strong understanding of power markets, including in MISO.

There will be three key personnel assigned to this project. Additional staff members and resources will be available for this project on an as-needed basis. Key staff members assigned are as follows:

- **Marie Fagan** (LEI Chief Economist) – Project Manager;
- **Julia Frayer** (LEI Managing Director) – Project Advisor;
- **Barbara Porto** (LEI Consultant) – Project Researcher.

**Marie Fagan** will be charged with the overall responsibility for this project and will act as Project Manager should LEI be selected as the technical consultant for LPSC. **Julia Frayer** will serve as a senior advisor, and **Himanshu Bhardwaj** will also serve as a core team member. In addition, LEI staff in Toronto and Boston will provide additional support as needed.

**Figure 2. Proposed LEI team organization chart**



## 1.2 Brief bios of staff assigned to the project

**Marie N. Fagan, PhD** is Chief Economist at LEI. With over 25 years of experience in research and consulting for the energy sector, Dr. Fagan’s career has spanned international upstream and downstream oil and gas, global coal, North American gas markets, and North American power markets. She has advised C-suite industry clients, buy-side and sell-side financial clients, as well as legislators and regulators, including LPSC; she has also served as an expert witness throughout

jurisdictions in North America. At LEI, Dr. Fagan's expertise across electricity markets and fuels provides integrated perspectives and supports sound strategic advice for clients. Dr. Fagan directs LEI's research of the Electric Reliability Council of Texas ("ERCOT") electric power market and has extensive experience working with clients in the MISO, PJM, and ISO-NE.

Dr. Fagan draws on her long-time experience across fuels and regions to ensure clients benefit from an integrated understanding of market rules and practices. Recent projects have included an engagement by a large utility to act as an Independent Evaluator for large-scale renewable RFPs and provide expertise in the areas of energy system and market planning/analysis; renewable energy generation, and solicitations. Her Independent Evaluator tasks included the facilitation and monitoring of communications between the utility and bidders, reviewing the initial shortlist evaluation and scoring, and the filing of two status reports and one closing report. Accordingly, Dr. Fagan's experience encompasses several of the support areas in which LPSC is seeking assistance.

**Julia Frayer**, a Managing Director at LEI, manages LEI's quantitative financial and business practice area, and also specializes in market and organizational design issues related to electricity. In addition to electric generation sector market power and anti-trust analysis, sample projects include cost of capital estimation; rate-setting analysis; short- and long-term forecasting of wholesale power prices; valuation of generators and vertically-integrated utilities; assessment of retail market design including provider-of-last resort portfolios and contracts; design of energy sales agreements; and advisory on structuring request for proposals and sale processes for energy assets and derivative contracts. As part of these analyses, Julia and her team of economists and consultants have developed and applied proprietary real-options based valuation tools, portfolio risk analytics, models of strategic bidding behavior, and sophisticated power system simulation tools, as well as customized econometric models. Julia will serve as a Project Advisor and add to the analytical rigor of the LEI's work.

**Himanshu Bhardwaj** is a Research Associate at LEI where he supports the firm's technical engagements with regulators, utilities and private equity firms on issues regarding market design, project evaluations, and wholesale price analysis. Himanshu recently joined LEI after completing graduate studies at Columbia University, NY. Himanshu has very broad strategy consulting experience spanning multiple industries and countries, including advising government entities and investors on a broad range of financial modeling and analysis topics.

Full CVs of the key team members are available in Section **Error! Reference source not found.**

## 2 Qualifications and experience

This section outlines LEI's understanding of the requested services, a general summary of LEI's skills, and selected relevant experience involving the independent evaluation of competitive procurement processes, and key engagements within the MISO region.

### 2.1 Understanding of the engagement

Three electric cooperatives, Southwest Louisiana Electric Membership Corporation ("SLEMCO"), Concordia Electric Cooperative, Inc. ("Concordia"), and Pointe Coupee Electric Membership Corporation ("PCME"), have jointly filed the Notice of Intent to competitively solicit long term power purchase contracts to serve the cooperatives, pursuant to the Commission's Market Based Mechanism ("MBM") Order. Moreover, as entities regulated by the LPSC, upon the selection of winning bids through the RFP process, the Co-ops will seek the certification and approval of all selected bids by the LPSC through a docketed proceeding, pursuant to LPSC's General Order dated September 30, 1983, and as amended by the Commission's Order No. R-30517 dated October 29, 2008. The certification process with the LPSC will ensure that all winning bids serve public convenience and necessity.

It is not anticipated that an Independent Monitor is needed as the Co-ops are not proposing self-build or self-supply and there are no affiliates that could seek to bid for these contracts. The Commission is, however, seeking consultants to assist the Commission Staff with the RFP process, compliance with the MBM Order, and certification proceedings.

### 2.2 Familiarity with Commission Orders

LPSC issued a General Order ("Market Based Mechanism Order") on April 10, 2002, which directed that the market-based mechanism in the format of a competitive solicitation process through request for proposals ("RFP") be used for procuring contracted or new generation capacity. The adoption of the market-based mechanism was to demonstrate that applications for the construction or acquisition of additional regulated generation by utilities is the least cost alternative and in the public interest. It is believed that process provides both the structure and use of the wholesale market sought by parties while at the same time preserving to the utilities their responsibility for supply planning and acquisition.

The Market Based Mechanism Order supplements LPSC's General Order of 1983 that requires a public utility seeking to construct or convert an electric generating facility or enter into a purchase power contract to obtain a certificate of public convenience and necessity from the Commission.

### 2.3 Summary of LEI experience

LEI has its roots in advising on the initial round of privatization of electricity, gas, and water companies in the UK. Since then, the firm has encouraged private sector clients, market institutions, and governments on privatization, asset valuation, deregulation, tariff design, market power, and strategy in virtually all deregulating markets worldwide.

LEI has extensive and deep expertise in procurement. Team members have served as independent monitors of energy supply auctions and have advised on the competitive procurement of energy for governmental entities, industrial actors, as well as electric utilities. In many of these projects, quantitative analysis of the bids and selection of the winning bids were part of LEI's mandate. Additional tasks included marketing solicitation to potential bidders, contract negotiation, qualification of bidders, dissemination of information ahead of bidding, assessment of competition in the process, and preparation of backstop or contingency plans in case of a failed RFP process. LEI has also worked with electric cooperatives in the context of ownership and regulatory model design.

LEI has helped to design competitive procurement processes for numerous regional regulatory bodies, emphasizing transparency, and economic efficiency as the underlying principles of the process. Team members have also advised on the advantages and disadvantages of various auction formats for the sale of electricity contracts and other derivative instruments, as well as the sale of physical assets.

LEI also has extensive experience reviewing client contracts, providing situation-specific comments and edits to ensure that our client's rights and priorities have been addressed. The firm has experience drafting standardized contracts from scratch, drawing on best practices used in other jurisdictions and tailoring these to the client's specific circumstances. LEI is familiar with the Edison Electric Institute's Master Power and Sales Agreement template and have adapted it for clients' use on several occasions. The firm also has access to a preeminent contract attorney who has extensive experience drafting innovative power contracts in international jurisdictions. LEI's contracting experience also extends to advisory support on credit terms, upon which the firm has opined in a variety of different settings ranging from developers obtaining financing to regulators trying to determine the appropriate credit requirements to use for an RFP.

LEI develops custom modeling approaches to capture the nuances of individual power markets, based on production cost modeling using LEI's proprietary POOLMod software. This modeling allows LEI to conduct rigorous evaluation of cost and risks for capacity development projects. LEI has also used game theoretic modeling using CUSTOMBid, which is also proprietary; real options modeling using a modified Black-Scholes approach, and Monte Carlo simulation. LEI also models related markets such as those for capacity, ancillary services, or emissions credits. In addition to the firm's modeling capability, LEI has access to market data, which allow the firm to perform high-quality simulations. The firm also has worked with several brokers and trading institutions that allow it to tap the markets and get up-to-the-minute bid/ask spreads for forwards and options in the MISO energy market.

## **2.4 Selected Relevant Experience**

### **2.4.1 Independent Evaluator/Monitor**

The team has served as Independent Evaluator/Monitor in numerous projects. For these assignments, LEI applies current industry standards associated with the evaluation of criteria applied in competitive solicitations, the quantitative methodologies used by utilities to evaluate bids, and contract issues. Moreover, through these assignments, the LEI team has reviewed and evaluated hundreds of power supply and demand-side management ("DSM") proposals encompassing a

range of technologies, fuel types, and contractual structures. Technologies evaluated have included gas-fired combined cycle and gas turbine projects, coal gasification options, pulverized coal, and fluidized bed projects, wind, biomass, geothermal, landfill gas, solar, and hydroelectric projects. Below are a sample of LEI's engagements.

- ***Independent Evaluator to Pacific Gas and Electric:*** LEI was part of a pool of consultants to the Pacific Gas and Electric Company's IE to monitor long-term resource solicitations involving affiliate, utility-owned or utility-turnkey bids and for all competitive tenders seeking products greater than two years in length. LEI worked with PG&E to ensure that offers were evaluated consistently and appropriately per the solicitation protocol and in accordance with applicable rules and processes of the California Public Utilities Commission ("CPUC"). The following activities were performed by LEI team:
  - Review and comment on the fairness and appropriateness of PG&E's evaluation methodology.
  - Review and report on whether PG&E fairly administered and implemented its evaluation methodology.
  - Review and report on whether the outreach that PG&E conducted to potential natural gas storage industry participants (Participant) was adequate and whether the solicitation was robust.
  - Identify whether any Participant in the RFO received undue information or failed to receive due information, that advantaged or disadvantaged a Participant unfairly.
  - Provide to PG&E, PG&E's Procurement Review Group ("PRG"), and the Energy Division of the CPUC presentations of the IE's findings. Participate as needed in any PRG and/or supplier meetings or teleconferences concerning this solicitation.
  - Prepare the IE report for inclusion in any Advice Letter filings.
  - Be available to testify as an expert witness in any CPUC proceeding regarding review of potential natural gas supply transactions arising from the RFO; if appropriate, prepare direct and rebuttal testimony, respond to data requests and perform other activities required to testify as an expert witness.
- ***Served as an independent monitor on behalf of the Utah Public Service Commission:*** LEI was part of a consortium serving as the independent monitor on behalf of the Utah Public Service Commission ("UT PSC") for a PacifiCorp renewable solicitation process. This process included: review of the solicitation process, documents, and modeling methodologies; monitoring, auditing, and validation of bid evaluation process; bid evaluation; and contract negotiation. Final report and testimony were filed with the UT PSC [Public Utility Commission of Oregon, Docket No. UM1368].

- **Acted as the fairness monitor for Ontario Power Authority's ("OPA") evaluation of "launch period" feed-in tariff ("FIT") applications:** The team aided in the design of the evaluation framework and provided on-going support during the evaluation process. LEI prepared a final report that outlined LEI's opinion as to the fairness of the overall process.
- **Evaluated applications to the Aboriginal Renewable Energy Fund:** LEI was responsible for independently evaluating applications received. LEI prepared a stand-alone due diligence report for each application. In addition to a general description of the project, the reports provided a review of:
  - the eligibility of the project under the program;
  - grid connection opportunities and issues;
  - property and resource control;
  - management capabilities and experience;
  - resource availability (e.g., wind speed, solar irradiance, fuel, etc.);
  - technology and equipment considerations; and
  - financial and economic considerations.

As part of the financial and economic considerations, LEI developed a financial model to assess a range of possible equity returns available to the project under varying assumptions.

- **Served as an independent monitor for Entergy New Orleans:** LEI was engaged to act as the independent monitor for Entergy New Orleans' solicitation of a Third Party Administrator to implement and deliver conservation and demand management programs on behalf of the utility. LEI oversaw the bid receipt, as well as the review and selection process. LEI provided a final report outlining the fairness of the overall process.
- **Served as auction monitor for Connecticut Department of Public Utility Control ("CT DPUC") Transitional Standard Offer:** LEI was hired by DPUC to oversee the Transitional Standard Offer ("TSO") auction by Connecticut Light and Power ("CL&P") for its load (more than 5,000 MW peak demand) in 2005 and 2006. The scope of the project included approving the RFP and communication protocol, participating in all bidder calls and negotiations, analyzing the New England market and developing scenarios for likely bids, and verifying CL&P's decision-making process for selecting winning bids. LEI also provided testimony to the DPUC based on its assessment of the auction process and its accordance with DPUC principles of competition.

#### 2.4.2 Other relevant experience in competitive procurement processes

Outside of the IE role, LEI team members have advised on the competitive procurement of energy for governmental entities, industrial actors, as well as electric utilities, independent power producers

and energy merchant firms. Under many cases, LEI's advisory role began at the initial stages of RFP design and contract drafting. In many of these projects, quantitative analysis of the bids and selection of the winning bids were part of our mandate.

- ***Reviewed procurement process for Delaware Public Services Commission ("PSC"):*** In 2015, LEI performed a review of the procurement process for the provision of Delmarva Power & Light Company ("Delmarva Power")'s Standard Offer Service, and provided information and analysis regarding alternative long-term electricity procurement options for Delmarva Power to meet its Standard Offer Service residential and small commercial retail load.
- ***Designed procurement process for CT DPUC to reduce costs of congestion for CT ratepayers:*** LEI assisted the DPUC in the evaluation of measures to reduce Federally Mandated Congestion Charges ("FMCC") in the State of Connecticut. As part of this effort, LEI performed an economic evaluation of the New England and Connecticut energy markets using its proprietary production cost model, POOLMod. LEI also designed and drafted the RFP process, RFP documentation, and contract template in order to best meet the needs of the DPUC and Connecticut ratepayers, using an innovative approach incorporating a hybrid physical and financial contract. LEI managed the procurement process and evaluated project bids.
- ***Supported Ontario Power Authority in improving procurement processes:*** LEI acted as an outside consultant to the Ontario Power Authority during a stakeholder process designed to enhance future competitive procurement processes held by the organization charged with ensuring adequate generating capacity in Ontario. LEI advised the OPA on the development of questionnaires sent to stakeholders, participated as an observer in a series of public and private consultations with stakeholders, including developers, major power users, system operators, and local distribution companies. LEI also prepared a final report that synthesized the comments made by the various stakeholders into a consistent format, and made recommendations to the OPA about ways to improve future procurement processes.
- ***Supported a Canadian ISO develop an effective competitive procurement process for the sale of dispatch rights associated with key generation assets:*** LEI provided advice on the selection of the type of sale process for strip contracts associated with key generation assets; the choices considered included a sealed-bid option (i.e., a bank mediated private sale) or some type of open auction process based on both theoretical (economic) and practical (implementation) considerations.
- ***Experience analyzing and assisting in the negotiation of supply options for a large industrial customer in South Eastern US:*** LEI was engaged by a large industrial customer to help review power purchasing options at one of its Southeastern facilities over the next three years. LEI assessed the probability of a supply interruption over the next three years due to the state of the transmission system in this region. The firm also assessed the facility's options for purchasing power for this load in the wholesale market.

- ***Assessed auction formats and outcomes in function of regional market dynamics:*** LEI researched and monitored auctions of supply obligations (for example, NJ's BGS) and sales of virtual capacity (such Alberta's MAP II auction of dispatchable rights and EdF's sale of capacity) on behalf of US investors looking at investment opportunities in similar transactions internationally. LEI provided a detailed qualitative and quantitative analysis of auction outcomes compared to relevant regional market dynamics.
- ***Support to the California Energy Commission ("CEC") on topic of information disclosure in context of procurement:*** LEI prepared a series of reports, filings, and testimonies to support the CEC's petition to the California Public Utilities Commission to force additional disclosures about future expected demand conditions by the state's investor-owned utilities: Southern California Edison, San Diego Gas & Electric, and Pacific Gas & Electric. Part of this analysis entailed a detailed assessment of RFP processes in California for retail load and considered the benefits of certain information release policy in creating investment signals and lowering effective costs of supply. LEI staff provided direct written and oral testimony and rebuttal testimony.
- ***Design and negotiation of power purchase agreements for hydro-electric resources:*** LEI assisted with the design and negotiation of power purchase agreements for hydro-electric generation resources. LEI's primary role was to develop incentive mechanisms to promote shifting of output into on-peak periods and efficient cost management under the quasi-regulatory contract structure.
- ***Designing large scale renewable energy procurement program:*** LEI was engaged by the government of a Middle Eastern country to develop a recommended design for renewable energy competitive procurements, a feed-in tariff program, and a sustainable energy procurement company. LEI led a multi-faceted on-the-ground team consisting of industry experts, economics, financial analysts, engineers, and legal advisors. Project includes extensive coverage of solar and wind.

### 2.4.3 Engagements for the LPSC

- ***Audit of Cleco Fuel Adjustment Clause:*** LEI is currently serving as the outside independent technical consultant in the matter of Docket No. X-35522, "Audit of Fuel Adjustment Clause Filings for Cleco Power LLC for the period beginning January 1, 2018 through December 31, 2019 (2018-2019).
- ***Audit of Entergy Fuel Adjustment Clause:*** LEI is currently serving as the outside independent technical consultant in the matter of Docket No. X-35523, "Audit of Fuel Adjustment Clause Filings for Entergy Louisiana, LLC for the period beginning January 1, 2016 through December 31, 2019 (2016-2019).
- ***Consultant for renewable energy tariff:*** LEI is currently serving as the outside independent technical consultant in the matter of Docket No. R-35423, "Rulemaking to Study Renewable Energy Tariff Option with a Focus on Bringing Renewable Energy to Louisiana"

#### 2.4.4 Engagements within the power markets encompassing the Midcontinent Independent System Operator (“MISO”) region of North America

LEI closely monitors the MISO market for on-going client work. LEI also releases the semi-annual regional market update and wholesale price forecast for eleven North American power markets, including MISO. LEI’s deep understanding of the MISO market would serve as a solid foundation in this engagement.

- **Management audit of a major utility in MISO:** LEI was engaged by a public service commission to audit management activities of a major vertically integrated utility in the MISO region. As part of the management audit, LEI also prepared a fuel inventory audit, where LEI assessed the utility's practices for economic purchase and use of fuel and electric energy, evaluated relevant fuel, and energy contract terms, investigated the operations of the utility's coal and nuclear generation units, and reviewed the prudence of coal inventory levels and inventory control procedures.
- **Due diligence for a potential asset acquisition in MISO:** LEI was engaged to assist in due diligence of a potential asset acquisition in MISO, involving gas-fired generation assets. LEI reviewed the contracts and financial analysis, with a specific focus on the assumed market value of capacity in the long term, and locational marginal prices for energy.
- **Asset evaluation:** LEI was engaged by an investment firm in association with asset valuation, due diligence support, and market analysis. Work involved reviewing documents in a virtual data room, and analysis related to drivers of gross margin for the asset: macroeconomics, weather fluctuations, fuel and electricity cost projections, and an overview of gas and electricity market in the region where the asset was located.
- **Renewables implementation:** LEI was retained by Kentucky's power utility regulator to review regulatory policies and tariff structures with a view to determining how they can be altered to elicit demand reductions and renewables implementation. The engagement included stakeholder interviews to solicit feedback from all relevant stakeholder groups on the necessary updates to the planning and approval process to meet a legislative mandate to increase the use of renewable resources and reduce demand. The review process consisted of analyzing the current processes for renewable and distributed generation and DSM programs and propose recommendations to improve the efficacy of these programs.
- **Revenue opportunity for gas-fired cogeneration units in MISO:** The purpose of the assignment was to inform the client on potential risks associated with the plants upon the termination of their power purchase agreements. Under this engagement, LEI simulated MISO’s energy and capacity markets and derived forecast of wholesale energy prices and capacity prices relevant to the units’ geographic location.
- **Economic analysis for a proposed transmission project in MISO:** LEI conducted a modeling exercise to determine the potential revenues for a proposed transmission project wheeling power from western MISO to eastern MISO (and eventually PJM). LEI evaluated both the revenue opportunities to the investors as well as social benefits to the MISO system and

evaluated the incremental value of the business strategy of selling the energy (and capacity) out of East MISO to third parties in PJM.

- ***Costs/benefits analysis of Entergy joining an RTO:*** LEI was hired by the Public Utility Commission of Texas (“PUCT”) to provide a cost-benefit analysis about the announced decision by Entergy to join MISO. LEI provided quantitative and qualitative analyses of specific costs/benefits attributable to Entergy Texas Inc. and its customers following membership in MISO or SPP.
- ***Review of ETI’s impact analysis of termination of PPA on consumers:*** LEI was hired by the PUCT to conduct a due diligence review of the analyses performed by ETI on the impact of the termination of specific PPAs while a member of MISO. LEI’s scope of work included a review of ETI’s inputs & results, methodology, and interpretation of MISO market rules.
- ***Due diligence and valuation update of a district cooling system in the Midwest:*** LEI was engaged by an investment firm in association with due diligence of a district cooling system in the Midwest. After one year, the client needed an update of the valuation of assets for purposes of spinning the assets off into a portfolio company. LEI used our capability for electric and capacity price modeling using our proprietary POOLMod tool to update the forecasts relevant to these assets, which included a district cooling plant and a combined steam and electricity plant.
- ***Estimating coal plants’ energy and capacity revenues in MISO:*** LEI performed the valuation of two power plants located in the Midwest region of the US to determine their potential value upon expiration of ongoing PPA. The plants revenues were calculated based on the 25-year forecasts of electricity prices in their respective zones. Given the long-term horizon of the modeling exercise, we also simulated an organized capacity market based on the Resource Adequacy requirements of MISO to estimate potential capacity revenues for the plants.

#### 2.4.5 Expert witness

- ***Expert testimony before FERC related to Shell Energy’s sale of capacity commitments :*** In 2009-2010, LEI team provided expert testimony before FERC related to Shell Energy’s sale of capacity commitments from facilities in New York to New England in an alleged market manipulation case. LEI team examined market rules, operating procedures, and pricing arrangements in New England and New York at the time of the investigation, and examined the participation of Shell in the capacity markets and compliance offers in the energy markets, commenting on the economic rationale behind the client’s must offer strategies in the energy market for capacity compliance. [EL09-48-000]
- ***Confidential FERC investigation in 2009-2010 of market manipulation in New England:*** LEI team assisted the client with certain matters pertaining to a FERC investigation. Specifically, the scope of this retention included economic and market analysis in support of a market participant in ISO New England’s day ahead load response program (“DALRP”). The LEI team also provided affidavits and deposed in connection with FERC investigation of behind-the-fence industrial generator and participation in a wholesale power market in New

England. The LEI team helped the client to respond to assertions of market manipulation and estimate market benefit provided through its participation in the demand response program.

- **Standard Market Design in ERCOT:** LEI examined issues related to the FERC's Standard Market Design and its implications for ERCOT and TXU. We assisted in the preparation of comments for submission to FERC. In the course of producing these comments, we evaluated specific proposals and benchmarked them against best practices worldwide. (2002)
- **ISO-NE tariff design:** LEI submitted testimony on behalf of ISO New England to the FERC to help defend ISO New England's self-funding tariff. LEI first defined the basic underlying economic principles for specifying the tariff, and then undertook to show how the tariff should be applied to various system users. The engagement involved an intensive financial modeling effort and frequent interaction with stakeholders. (2000) [ER01-316-000]
- **Triennial market power analysis (southeast region):** in support of a client's application to renew market-based rate authorization under the provision of FERC, LEI performed Pivotal Suppliers Analysis and Market Share Analysis for the Entergy balancing authority area. (2011) [ER97-4281 et al.]
- **Triennial market power analysis (northeast region):** in support of a client's application to renew market-based rate authorization under the provision of FERC, LEI performed Pivotal Suppliers Analysis and Market Share Analysis for the Northeast region, including New England, New York, PJM as well as the Connecticut, NYC and PJM East submarkets. (2011) [ER97-4281 et al.]
- **Triennial market power analysis (northeast region):** in support of a client's application to renew market-based rate authorization under the provision of FERC, LEI performed Pivotal Suppliers Analysis and Market Share Analysis for the Northeast region, including New England, New York, and PJM. (2011) [ER10-2895 et al.]
- **Buyer market power analysis and vertical market power analysis:** in support of a client's opposition of a proposed electric transmission and distribution utility merger in the Northeast US, LEI analyzed the potential competitive market effects on a vertical scale and considered the extent of buyer market power for the purchase of standard service (full requirements) products. LEI supported the client at FERC [EC11-35-000].<sup>1</sup> (2010-2011)
- **Merger-related market power analysis:** LEI evaluated the PJM market and considered the competitive effects of the proposed merger of FirstEnergy and Allegheny, in light of current and evolving market conditions for PJM West area. LEI's analysis contributed to the negotiated, confidential settlement between certain parties. (2010) [EC10-68-000]
- **Updated market power analysis:** prepared for a US utility's triennial review of market-based rate authorizations for certain subsidiaries in the northeast region. LEI analyzed the company's market power in PJM and ISO-NE. (2010) [ER98-4159 et al.]
- **Section 203 and 205 analysis in support of NRG's acquisition of certain Dynegy assets in CAISO and ISO-NE:** LEI was engaged to provide testimony in support of a proposed

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<sup>1</sup> LEI's white paper was not filed with FERC but was relied upon by the client when they filed protest.

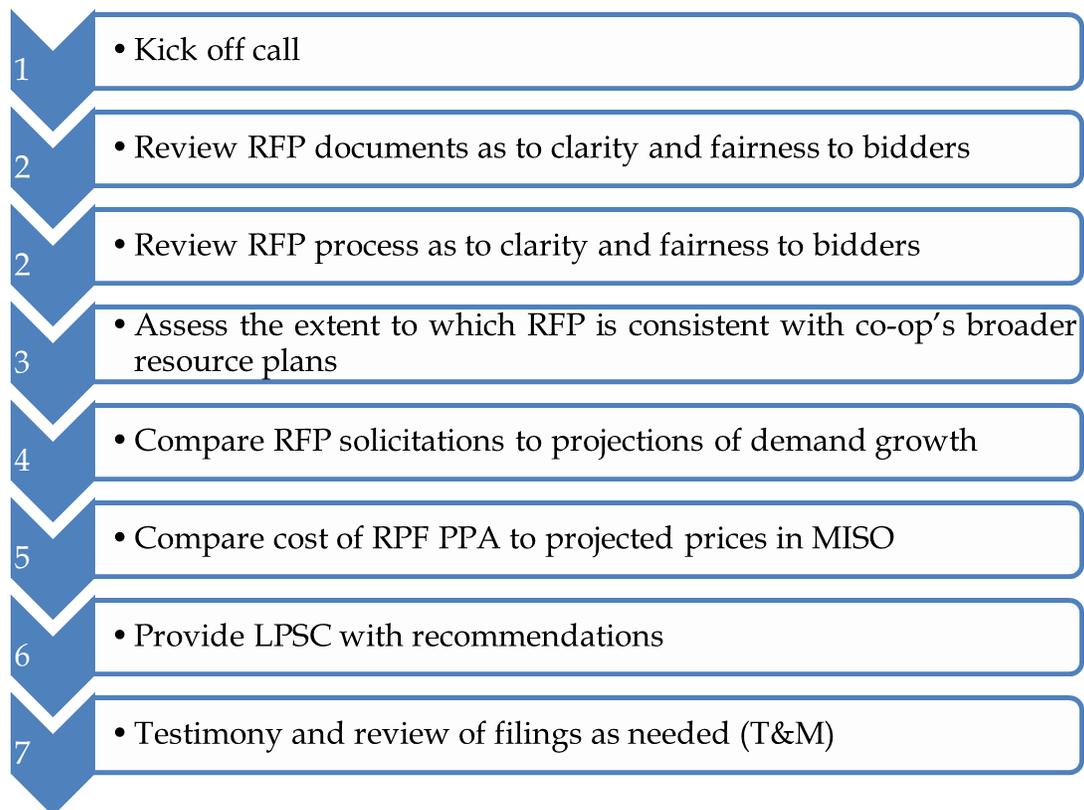
acquisition. LEI performed a Delivered Price Test (“DPT”) for CAISO and ISO-NE energy markets as well as a standalone Herfindahl-Hirschman Index (“HHI”) analysis for the capacity markets. In addition, LEI discussed the impact of the acquisition of the ancillary services markets. (2010) [EC10-88-000]

- ***Section 203 and 205 analysis in support of an asset acquisition in the Entergy control area:*** LEI was engaged to provide testimony in support of a proposed acquisition in Entergy’s control area. LEI conducted a change in HHI analysis as well as an analysis of the acquirer’s net load position for a Section 203 filing. LEI also conducted the Section 205 analysis and showed that with the acquisition, the client still passes the pivotal supplier and market share screens. (2010) [EC10-86-000]
- ***Updated market power analysis:*** prepared for a US IPP’s triennial review of market-based rate authorizations for certain subsidiaries in the southwest region. LEI analyzed the company’s market power in CAISO. (2010) [ER99-115 et al.]
- ***Critique of market power allegations in California during the Energy Crisis:*** LEI is serving as advisor to a Canadian-based electricity supplier related to allegations of market power abuse during the California crisis period; LEI has been examining and critiquing the underlying analysis for the related cases at FERC now on remand from the US Court of Appeals, as well as the new complaint filed by the California parties. (2010) [EL01-10-000 et al.]
- ***Preparation of analysis for generation market power under FERC’s indicative screens for market-based rate authorization:*** in support of the acquisition of a 21 MW photovoltaic solar facility, LEI performed an updated market power analysis for acquirer’s affiliates in the California ISO which have been granted market-based rate authorization, and prepared the related Section 203 filing. (2010) [ER10-204-000]

### 3 Proposed plan of action

Throughout the Co-ops' RFP process, along with any subsequent certification proceedings, LEI will review all relevant applications, testimony, and supporting documentation filed by the Co-ops. Also, LEI will conduct and review discovery, assist in the preparation and review of direct and cross-answering testimony, assist LPSC staff in preparation of hearing briefs and filings, provide expert testimony in hearings, and participate in all relevant meetings and discussions through the RFP and certification process. In doing so, LEI plans to pursue the proposed plan of action summarized in Figure 3 below. In alignment with what LPSC noted in the RFP for this engagement, LEI understands that the LPSC and its staff will have the right to determine how these tasks will be carried out.

**Figure 3. LEI's proposed plan of action (7 tasks)**



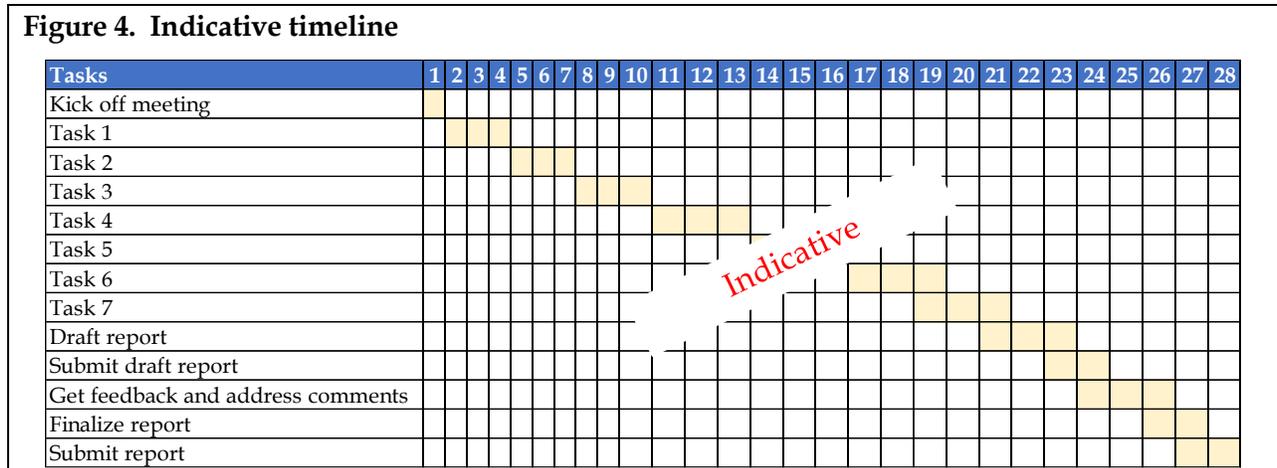
LEI's key findings will be summarized in the form of a report to the LPSC. Moreover, in the course of this engagement, LEI senior staff will confer with the LPSC staff in the form of periodic calls and by e-mail. LEI senior staff could be available to meet with the LPSC in Baton Rouge, Louisiana, depending on circumstances around the COVID-19 pandemic and social distance protocols.

## 4 Timeline and budget

### 4.1 Estimated timeline

LEI expects to have a kick-off meeting a few weeks after the signing of the contract. LEI will also take advantage of this time to gather data and information needed to conduct subsequent tasks outlined in Section 3. LEI expects the project to take between 26 and 28 weeks, depending on LPSC’s timeline for the RFP process and certification proceedings. LEI anticipates that the schedule and the deadlines will be finalized during the kick-off meeting.

**Figure 4. Indicative timeline**



### 4.2 Estimated professional fee budget

LEI proposes to complete Tasks 1-6, as detailed in Section 3, for a fixed professional fee of \$40,000. The professional fee for Task 7, which will involve testimony and review of filings as needed, along with time spent on doing additional analysis beyond the scope of work or providing additional data beyond what is discussed in this proposal, will not exceed \$10,000, for a total professional fee budget for Tasks 1-7 not to exceed \$50,000.

### 4.3 Expense budget

LEI estimates that the additional cost for reasonable and customary reimbursable expenses, such as (but not limited to) printing, courier, and data acquisition fees, if any, will not exceed (\$600). In addition, travel costs are estimated in Figure 5 below. LEI will comply with all expense caps as outlined in the State of Louisiana Division of Administration Travel Policies and Procedures Memorandum. Accordingly, the total professional fees including the expense budget will be approximately \$53,875.

**Figure 5. Travel costs**

Travel	# trips	# people	# nights	Total
Meetings with LPSC	2	1	1	\$1,550
Stakeholder meetings	3	1	2	\$2,325
<b>Total estimated costs</b>				<b>\$3,875</b>

*Indicative*

## 5 Conflict of Interest

LEI presently has no interest, direct or indirect, which would conflict with the performance of services under this contract and shall not employ, in the performance of this contract, any person having a conflict.

## 6 Resumes of key experts

Marie N. Fagan, PhD



*Chief Economist*

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### KEY QUALIFICATIONS:

Marie Fagan is Managing Consultant and Lead Economist at London Economics International, LLC, based in Boston, Massachusetts. With over 25 years of experience in research and consulting for the energy sector, Marie's career has spanned international upstream and downstream oil and gas, global coal, North American gas markets, and North American power markets. She has advised C-suite industry clients, buy-side and sell-side financial clients, as well as legislators and regulators; she has served as an expert witness. At LEI, Marie's expertise across electricity markets and fuels provides integrated perspectives and supports sound strategic advice for clients.

Marie has experience as a project manager for complex, multi-year engagements, include a two-year project for the Maine Public Utilities Commission in 2014-2016, and a two-year project for the Mississippi Public Service Commission in 2017-2019. She has deep experience in econometric analysis, and recently completed a comprehensive study of oil demand elasticities for Columbia University.

Marie leads LEI's engagements related to oil and natural gas market analysis. She directs gas pipeline modeling efforts based on a sophisticated network model, supporting outlooks for natural gas prices and basis, and analysis of flows on North American interstate pipelines. She provides in-depth expert testimony on issues such as basis differentials, pipeline capacity and utilization in key regions, and LNG import and export supply and demand. Projects have included serving as independent market expert for the Maine Public Utilities Commission, in the evaluation of the costs and benefits of new natural gas pipelines into New England.

Marie directs LEI's research of the Electric Reliability Council of Texas ("ERCOT") electric power market. Recent projects have included examination of the political, legislative, and economic drivers the led to creation of ERCOT's Competitive Renewable Energy Zones ("CREZ"), and assessment of the potential for state-level support for further expansion of CREZ transmission lines.

From 1996-2014, she was with Cambridge Energy Research Associates ("CERA," now part of IHS, Inc.). She served as an Associate, then Associate Director for CERA's Global Oil research practice, as Director for the North American Gas research practice; she founded the CERAVIEW Institutional Investor Service and co-founded CERA's Global Steam Coal service; she served as Senior Director for CERA's North American Electric Power service and of IHS CERA's Upstream Strategy service. Before joining CERA, Marie served as an economist with the United States Energy Information Administration ("EIA"), conducting analysis and modeling supporting the

Annual Energy Outlook (“AEO”), and conducting analysis of energy company financial performance.

Marie is the author of original research with publications in academic and industry journals. She holds a PhD in Economics from the American University in Washington, DC. She is a member of the Energy Bar Association, the American Economic Association, International Association for Energy Economics, and the Boston Economic Club, and is a member of the Business Committee of the US Association for Energy Economics.

**EDUCATION:**

Institution	American University, Washington DC
Date:	1995
Degree(s) or Diploma(s) obtained:	PhD in Economics. Dissertation: “Measuring Cost and Efficiency in US Crude Oil Resource Development, 1977-1990: A Frontier Translog Cost Function Approach”

Institution	University of Connecticut
Date:	1984
Degree(s) or Diploma(s) obtained:	Bachelor of Science, Business Administration (Finance)

**EMPLOYMENT RECORD:**

Date:	2014-present
Location:	Boston, MA
Company:	<b>London Economics International LLC (“LEI”)</b>
Position:	Managing Consultant and Lead Economist

Date:	2003-2014
Location:	Cambridge, MA
Company:	<b>IHS (formerly Cambridge Energy Research Associates (“CERA”))</b>

Position:	<p>Senior director, Upstream Strategy Advisory service (2012-2014).</p> <ul style="list-style-type: none"> <li>Responsible for the re-vamp of research services and development of new research services focused on the needs of oil and gas exploration and production companies. Defined product architecture, defined deliverables, and generated research, as well as managed the delivery of research. Responsible for marketing plans and focus, conducting presentations to Board of Directors meetings and other C-suite client groups. Keynote speaker at IHS CERA events such as CERAWeek and other industry events and conferences</li> </ul> <p>Senior director, North American Gas, Power, and Renewables group (2007-2011).</p> <ul style="list-style-type: none"> <li>Responsible for thought leadership, development, and delivery of research for IHS CERA's North American Electric Power Advisory Service and North American Gas and Power Scenarios Service. Led client engagements, as well as wrote and published research. Provided oversight and direction of the launch of a new research service, the IHS CERA Global Steam Coal Advisory Service</li> </ul> <p>Director/Senior director, CERAVIEW Institutional Investor Service (2004-2007)</p> <ul style="list-style-type: none"> <li>Created, launched and directed IHS CERA's first research service encompassing the oil, gas, and power sectors to serve a targeted client community. Developed a new IHS CERA research publication, <i>Investors' Energy Monthly</i>, and served as publication's executive editor. In this role, won the IHS Circle of Excellence Award in 2005</li> </ul> <p>Director, North American Gas Advisory service (2003-2004)</p> <ul style="list-style-type: none"> <li>Responsible for rapid re-construction and turnaround of one of CERA's largest research advisory services. Contributed to and helped define the research agenda, and was responsible for the editorial content and publication of major research and analytical reports related to gas infrastructure and markets in North America. Advised senior executive clients, including leading discussions of sensitive client-related issues.</li> </ul>
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Date:	2001-2002
Location:	Boston, MA
Company:	<b>International Human Resources Development Corporation ("IHRDC")</b>
Position:	<p>Director, International Gas Program</p> <ul style="list-style-type: none"> <li>Developed and implemented management training programs for middle and senior energy company managers, designed interactive presentations and teaching materials, and served as instructor. Taught principles of project development and financial analysis of energy company operations.</li> </ul>

Date:	1996-2001
Location:	Cambridge, MA
Company:	<b>CERA</b>
Position:	<p>Associate director, Global Oil advisory service (1999-2001)</p> <ul style="list-style-type: none"> <li>• Authored original research reports, responsible for client presentations and the management, execution, and delivery of consulting projects.</li> </ul> <p>Associate, Global Oil advisory service (1996-1998)</p> <ul style="list-style-type: none"> <li>• Developed and maintained IHS CERA's expertise in exploration and production costs, technology, and financial factors affecting the upstream oil and gas industry.</li> </ul>

Date:	1994-1996
Location:	Washington, DC
Company:	<b>US Department of Energy, Energy Information Administration</b>
Position:	<p>Economist</p> <ul style="list-style-type: none"> <li>• Conducted financial analysis of upstream and integrated oil and gas companies; evaluated and implemented conceptual approaches to analysis of energy markets and market incentives, and wrote and published original research reports.</li> </ul>

Date:	1989-1994
Location:	Vienna, Virginia
Company:	Decision Analysis Corporation of Virginia (DAC)
Position:	<p>Research associate/ Associate</p> <ul style="list-style-type: none"> <li>• Performed economic and econometric analysis, modeling, and forecasting to support the Energy Information Administration energy end-use models. Designed the National Energy Modeling System's Commercial Energy Demand Model; conducted financial analysis of energy companies.</li> </ul>

Date:	1988
Location:	Washington DC
Company:	US Department of Energy, Office of Policy, Planning and Analysis
Position:	<p>Intern</p> <ul style="list-style-type: none"> <li>• Researched waste-to-energy potential in the United States; constructed a database, developed econometric models, analyzed results and produced written reports.</li> </ul>

## RECENT PROJECT EXPERIENCE:

<i>Date:</i>	October 2018 – April 2018
<i>Location:</i>	United States, ISO-NE
<i>Company:</i>	Massachusetts Office of the Attorney General
<i>Description:</i>	<p><b>Winter fuel reliability/electric power market design</b></p> <p>The MA Attorney General's Office of Ratepayer Advocacy ("AGO") engaged LEI to examine ISO-New England's proposals to address potential winter fuel security issues facing the electric power sector. Marie led the project, including developing an independent definition of the problem to be solved; developing of solutions, identifying potential allies in the NEPOOL stakeholder community; analyzing other stakeholders' proposals; and working with the AGO in the stakeholder process. LEI developed an alternative proposal, a forward auction for stored energy reserves based on the financial concept of an American call option with a two-dimensional bid (the option premium and strike price). LEI demonstrated that relatively simple algorithms could result in cost-effective clearing of such an auction.</p>

<i>Date:</i>	February 2018 – December 2018
<i>Location:</i>	Global
<i>Company:</i>	Columbia University School of International and Public Affairs, Center on Global Energy Policy
<i>Description:</i>	<p><b>Econometric analysis of crude oil price and income elasticities of demand</b></p> <p>LEI was engaged by the Columbia University, Center for Global Energy Policy ("CGEP") to conduct econometric analysis of global oil demand. Marie directed and managed the project, the foundation of which was a detailed econometric analysis of price and income elasticities of oil demand. Marie employed a variety of specifications of econometric models (including static and dynamic models, and symmetric and asymmetric models) and estimated separate models for crude oil, gasoline, and diesel demand. She used country-level data covering 40 years (1977-2016), aggregated into panel (pooled cross-section and time series) data sets for OECD, non-OECD, and oil-producing countries. Marie examined and reported the results of econometric tests covering time-series properties of the data (tests for integration and cointegration), performance of the log linear model specification as compared to an intrinsically non-linear specification, and the pool-ability of cross-sectional data. LEI's results were provided in a comprehensive report titled "Oil demand: Up the down staircase," which underwent academic review outside of CGEP. The report will be published by CGEP.</p>

<i>Date:</i>	September 2018-December 2018
<i>Location:</i>	United States, ISO-NE
<i>Company:</i>	Maine Public Utilities Commission
<i>Description:</i>	<p><b>Avoided energy supply costs</b></p> <p>LEI was engaged to perform a critical review of the methodology and assumptions which underpinned other consultants' analysis of avoided energy supply costs ("AESC"). Marie led the gas market forecast, and the critical review of the other consultants' gas price forecast. She also led a careful examination of the economic theory and econometric</p>

	techniques used by the other consultants to estimate demand-induced price reduction effects (“DRIPE”). Owing to miss-specified models and/or unwarranted assumptions (such as a perfectly inelastic demand curve for natural gas in the long term) the other consultants’ DRIPE estimates were generally too high.
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<i>Date:</i>	June 2018-December 2018
<i>Location:</i>	United States, PJM
<i>Company:</i>	Ohio Public Utilities Commission
<i>Description:</i>	<p><b>Management performance and financial audit of large utility</b></p> <p>LEI was engaged to perform a management performance and financial audit of AEP Ohio’s Alternative Energy Rider (“AER”). Marie led the project which required examining the terms of power purchase agreements (“PPAs”) for wind and solar power, the cost of renewable energy credits (“RECs”); energy and capacity market prices; inventory strategies, and the accuracy of AEP Ohio’s load forecasts. Marie recruited a local Ohio accounting firm to perform the financial portion of the audit; she provided guidance (as the firm had not previously audited a utility) and oversight of their work as well as the work of the LEI in-house team.</p>

<i>Date:</i>	March - September 2018
<i>Location:</i>	United States, MISO, Michigan
<i>Company:</i>	NGO
<i>Description:</i>	<p><b>The role of Enbridge Line 5 in NGLs and crude oil transport in Michigan</b></p> <p>For a non-governmental organization (“NGO”) Marie produced three white papers examining the current and future role of Enbridge Line 5 in Michigan related to three issues: propane supply in Michigan, transportation for crude oil producers in Michigan, and supply of crude oil to Michigan-area refineries. Marie’s analysis of the propane market included a comparative static econometric analysis of the supply and demand from propane in Michigan, explained in non-technical language. The white papers were used by the client in discussions with the Governor of Michigan and other stakeholders</p>

<i>Date:</i>	July 2017-June 2018
<i>Location:</i>	United States, MISO, Minnesota
<i>Company:</i>	Minnesota Department of Commerce
<i>Description:</i>	<p><b>Role of Enbridge Line 3 in heavy and light crude oil supplies</b></p> <p>Marie served as independent market expert assisting the Minnesota Department of Commerce in evaluating the application of Enbridge Energy for a Certificate of Need for its Line 3 oil pipeline expansion project (Docket No. PL-9/CN-14-916, OAH Docket No. 65-2500-32764). Marie’s analysis covered global and local trends in refined product demand and crude oil supply, refinery utilization rates and utilization of high-conversion refinery capacity in Petroleum Administration for Defense District (“PADD”) 2 and in the local Minnesota region. Her analysis required detailed examination of the assumptions and methodology of an oil pipeline linear programming-based model, in order to assess another witness’s testimony which relied on the model. Marie provided written testimony; responded to interrogatory requests, provided written surrebuttal, and oral testimony.</p>

<i>Date:</i>	June 2017-December 2018
<i>Location:</i>	United States, MISO, Mississippi
<i>Company:</i>	Mississippi Public Service Commission
<i>Description:</i>	<b>Management audit of large vertically integrated utility</b> Marie led a management audit of the fuel (gas, coal, and nuclear) and energy procurement activities of Entergy Mississippi. Marie's team assessed fuel and energy contract terms, and reviewed the prudence of coal and nuclear fuel procurement and inventory practices. Marie's team also assessed management, organization, controls, strategies, and outcomes for the company's hourly MISO offers. The team investigated the operations of a nuclear power plant, and the financial implications of the utility's power purchase agreement for nuclear power. Marie appeared before the Commission to present and defend findings.

<i>Date:</i>	November 2018 - February 2018
<i>Location:</i>	WECC
<i>Company:</i>	PacifiCorp
<i>Description:</i>	<b>Independent evaluator ("IE") for energy procurement</b> LEI was retained as an IE by PacifiCorp for its system-wide 2017 Solar RFP. Marie led the project, which included a review of PacifiCorp's Solar RFP, the facilitation and monitoring of communications between PacifiCorp and bidders, performing a review of the initial shortlist evaluation and scoring, and the filing of status reports and the final IE closing report.

<i>Date:</i>	April, May 2017
<i>Location:</i>	United States and Canada
<i>Company:</i>	Private client
<i>Description:</i>	<b>Review of investable energy sectors</b> For a private equity client, Marie led an extensive project reviewing a wide range of investable energy sectors in the United States and Canada. The sectors included: electricity generation (natural gas, wind, solar, hydro), AMI, distributed resources, demand response, retail energy, gas LDCs, gas storage, gas pipeline transportation, LNG-related infrastructure, vertically-integrated utilities, electric distribution utilities, and water utilities. LEI assessed the investment potential of each sector for the next five years, and proposed a methodology to screen and identify investment opportunities and execute on these opportunities.

<i>Date:</i>	March 2017
<i>Location:</i>	Alberta, Canada
<i>Company:</i>	Private client
<i>Description:</i>	<b>Analysis of capacity markets</b> LEI was engaged to provide global perspectives on the detailed mechanisms that make up capacity markets, so that eventual capacity market design in Alberta will be workable and efficient, with minimal unintended consequences. Marie led research and delivered

	a detailed report on market power mitigation mechanisms and their potential impacts on capacity market performance.
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<i>Date:</i>	February 2017
<i>Location:</i>	North America
<i>Company:</i>	Provider of services to vehicle fleet industry
<i>Description:</i>	<b>Outlook for electrification of transportation</b> Marie developed scenario outlooks for electric vehicle (“EV”) market penetration in the United States; examined the role of electric utilities (and their emerging EV-related business models) as potential partners versus competitors to the downstream transportation industry; identified activities and strategic positioning of upstream and downstream industry participants; led discussion of implications of “electrification of transportation” for fleet service companies, convenience stores, and other downstream industry participants. Presented material to company’s partner advisory board.

<i>Date:</i>	December 2016
<i>Location:</i>	Alberta, Canada
<i>Company:</i>	Private client
<i>Description:</i>	<b>Analysis of capacity markets</b> To support Board-level understanding of the implications of potential capacity market designs in Alberta, Marie prepared a detailed review and comparison of capacity markets across international and North American jurisdictions. Report concluded “the devil is in the details” of capacity market design. Market design details with potentially large impacts on the client were resource eligibility definitions, price setting mechanism, demand curve design, performance requirements, and market power mitigation rules.

<i>Date:</i>	September 2016
<i>Location:</i>	Northeast United States
<i>Company:</i>	Private client
<i>Description:</i>	<b>Examination of solar business models</b> For a client performing due diligence related to a potential investment in business-to-business behind-the-meter solar in the Northeast United States, Marie led a project examining US federal and state incentives for solar adoption, and assessing business models used for targeting commercial, institutional, and industrial sectors. For each business model, LEI assessed the competitive environment—who is operating in the sector, what is their go-to-market strategy, and in general how these models have been performing. Marie’s team also provided a 10-year outlook for solar renewable energy credits (“SRECs”) for certain jurisdictions. Finally, LEI developed key questions the client should ask as part of its evaluation of potential transactions in the behind-the-meter solar sector.

<i>Date:</i>	October 2016-November 2016
<i>Location:</i>	California, Kansas
<i>Company:</i>	Law firm
<i>Description:</i>	<b>Support for counsel in contested matter</b> Marie prepared an expert report in support of litigation in Case 15CV-04225 in the District Court of Johnson County, Kansas. LEI was retained by counsel to examine the value of the green attributes of landfill gas ("LFG") produced by a project in Kansas City and sold under long-term contract to the Sacramento Municipal Utility District ("SMUD"). Marie's report demonstrated several flaws in the opposing counsel's expert's methodology. Marie proposed an alternative, more accurate methodology for valuing the green attributes of LFG, based on market fundamentals driven by the California RPS requirements.

<i>Date:</i>	August 2016-October 2016
<i>Location:</i>	Maine
<i>Company:</i>	Maine Public Utilities Commission
<i>Description:</i>	<b>Macroeconomic impact of biomass generation</b> Marie led an engagement to estimate the macroeconomic impact of biomass generation within the state of Maine (Maine PUC Docket No. 2016-00084). This included direct, indirect, and induced impacts on: permanent direct jobs, payments to municipalities, payments for fuel harvested in the State, payments for in-state resource access, in-state purchases of goods and services, and construction-related jobs and purchases. Marie used the macroeconomic model known as IMPLAN to capture the economic impacts on industries including logging, sawmills, and other forestry-related industries and well as on state and local taxes.

<i>Date:</i>	May 2016
<i>Location:</i>	ERCOT/Texas
<i>Company:</i>	Private client
<i>Description:</i>	<b>Examination of ancillary services</b> Marie conducted a case study assessing the current ancillary services ("CAS") market in ERCOT, outlining the structure of ERCOT's proposed Future Ancillary Services Nodal Protocol Revision Request ("FAS-NPRR"), and examining the implications of ERCOT's experience so far for the Alberta electricity market. Findings included the following: While it was widely expected that the addition of large amounts of wind (and other non-synchronous generation) on the ERCOT system would significantly increase the need for ancillary services, by 2015, ERCOT's procurement of CAS products had not increased compared with 2011. However, the need for synchronous inertial response ("SIR") which is not part of CAS did increase somewhat over the time period, though ERCOT did not include SIR in its FAS-NPRR.

<i>Date:</i>	April 2016-May 2016
<i>Location:</i>	ERCOT/Texas
<i>Company:</i>	Renewable power investor
<i>Description:</i>	<p><b>Due diligence in ERCOT</b></p> <p>LEI was hired to perform due diligence for an investor interested in wind assets in ERCOT. Marie examined the political, legislative, and economic drivers of ERCOT's Competitive Renewable Energy Zones ("CREZ") and provided an assessment of state-level support for further expansion of CREZ transmission lines. She also provided assessment of and outlook for ERCOT's and the Public Utility Commission of Texas's views of the "system cost" of wind (the potential increased need for ancillary services and firm capacity on the system).</p>

<i>Date:</i>	June 2014-April 2016
<i>Location:</i>	Maine
<i>Company:</i>	Maine Public Utilities Commission
<i>Description:</i>	<p><b>Project manager and testifying expert</b></p> <p>Marie served as project manager, independent market expert, and expert witness for the Maine Public Utilities Commission, in the evaluation of the costs and benefits of alternatives for expansion of natural gas supply into Maine pursuant to the Maine Energy Cost Reduction Act (MPUC Docket #2015-00071). Marie reviewed and evaluated proposals for firm natural gas transportation service by pipeline developers. These evaluations included LEI's review of commercial terms include in the pipeline Precedent Agreements that underpin capacity expansion projects; review of contract provisions for Firm Transportation Agreements and Negotiated Rate Agreements; and evaluation of the status of the FERC and state-level permitting process for each pipeline proposal. Marie provided expertise in upstream natural gas (exploration and production), midstream natural gas (interstate pipelines) and global energy markets including oil and LNG markets, to provide a solid grounding for LEI's long-term outlook for New England natural gas prices. Marie directed the natural gas network modeling (using GPCM, an industry-standard network model of the North American natural gas system) and power simulation modeling (using LEI's proprietary POOLMod model) to arrive at a quantitative cost-benefit analysis of proposals. She authored reports provided to the Commission; responded to discovery from other parties; prepared discovery questions and cross-examined witnesses; reviewed testimony by other parties and provided assessments of the issues presented; and she served as an expert witness in the proceedings.</p>

<i>Date:</i>	November 2015-December 2015
<i>Location:</i>	US Northeast
<i>Company:</i>	Renewable power developer
<i>Description:</i>	<p><b>Due diligence for assets in ISO-NE (Maine)</b></p> <p>LEI was hired by a wind developer to provide a quantitative assessment, based on an economic dispatch model, of congestion/curtailment risk for a wind asset in Maine. LEI used its proprietary dispatch model, PoolMod, to provide an outlook from 2016 through 2020 of hourly LMPs, as well as the components of LMP (energy, losses, and congestion). We incorporated information from the interconnection impact study to examine system</p>

	limits for the plants in question. LEI also provided an assessment of risk of outages based on NERC outage data for NPCC. Marie led the project
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<i>Date:</i>	October 2015-November 2015
<i>Location:</i>	ERCOT/ Texas
<i>Company:</i>	Private equity company
<i>Description:</i>	<b>Due diligence for assets in ERCOT</b> LEI was hired to forecast the potential energy revenues of two wind farms in Texas, using its proprietary dispatch model, PoolMod. Marie led the project, and also examined the implications of the PPA related to the two wind farms.

<i>Date:</i>	July 2015
<i>Location:</i>	North America/United Kingdom
<i>Company:</i>	UK Department of Energy and Climate Change
<i>Description:</i>	<b>Examination of design of auctions</b> Marie participated in a review of auction design for the UK DECC. The UK market regulator was interested in whether US power markets evaluate generation bids based on criteria other than the price bid, specifically, if the length of contract had a role in the auctions. LEI reviewed capacity market rules for PJM, ISO-New England and the New York ISO. Marie examined whether and for how long a "lock-in" option for the first-year capacity price is offered to new generation assets bidding into the auctions. She also reviewed international spectrum auctions, North American gas transmission open season rules, and international auctions for toll roads to examine whether and how duration or length of contract is incorporated into bidding.

<i>Date:</i>	May 2015
<i>Location:</i>	Connecticut; Virginia
<i>Company:</i>	Private equity company
<i>Description:</i>	<b>Review of gas transportation contracts</b> Marie evaluated contracts for firm gas transportation capacity for gas-fired plants in Virginia and Connecticut.

<i>Date:</i>	April 2015
<i>Location:</i>	Connecticut; New Jersey
<i>Company:</i>	Private equity company
<i>Description:</i>	<b>Outlook for natural gas prices</b> LEI was retained to forecast delivered gas prices in New England (Connecticut) and PJM (New Jersey) and locational marginal prices as well as retail electricity prices in Connecticut. Marie led the gas market analysis.

<i>Date:</i>	August 2014 - January 2015
<i>Location:</i>	North America
<i>Company:</i>	Private client
<i>Description:</i>	<b>Monthly energy market reports</b> LEI was engaged to support an energy company's Regulatory Group in its administering of the company's compliance program. The purpose of the engagement was to ensure that client's transactional and business groups were made aware of market rules and regulatory risks. This involved creating and delivering a monthly report covering developments by regional market and traded products which included: energy, capacity, long-term transmission service, FTR auctions, ancillary services, diesel oil, PRB coal, natural gas commodity, transmission, and storage, RECS, and CO <sub>2</sub> . Marie served as project manager and executive editor of the monthly report and monthly conference call, and provided the research and insight on US gas, oil, and coal markets, and FERC activities.

<i>Date:</i>	October 2014
<i>Location:</i>	New England
<i>Company:</i>	Private equity company
<i>Description:</i>	<b>Assessment of ancillary service market</b> To support potential acquisition of hydropower assets, Marie provided analysis of ISO-New England's Locational Forward Reserves Market ("LFRM").

<i>Date:</i>	April-June 2014
<i>Location:</i>	US Midwest
<i>Company:</i>	Private equity company
<i>Description:</i>	<b>Due diligence for asset in PJM</b> For due diligence related to a district cooling system in the Midwest, Marie reviewed contracts and developed a model for projecting revenues and gross margins for the asset. Marie provided insight by identifying the potential for lower customer contract prices at renewal (in contrast to the seller's assumptions) and other areas of revenue risk.

<i>Date:</i>	June 2014
<i>Location:</i>	North America
<i>Company:</i>	Law firm
<i>Description:</i>	<b>Examination of FERC policies and practices</b> LEI was engaged by a law firm on behalf of a Canadian energy company to provide market advisory for an investigation related to the timing of outage scheduling under PPAs. Marie provided research and expertise covering FERC practices related to monitoring, enforcement, and definition and prosecution of alleged market manipulation.

<i>Date:</i>	April-May 2014
<i>Location:</i>	Nova Scotia
<i>Company:</i>	Government of Nova Scotia
<i>Description:</i>	<b>Organization of energy system</b>

	Marie provided a detailed overview of the Nova Scotia gas and power sectors, including governing institutions, the legal and regulatory framework, recent developments and challenges, and SWOT analysis.
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## **PUBLICATIONS:**

### **Technical/Academic**

“Business Cycles and Innovation Cycles in the US Upstream Oil & Gas Industry” with Robert Kleinberg, PhD. Working paper under review by Columbia University Center on Global Energy Policy (“CGEP”); accepted for presentation at American Economic Association/ Allied Social Sciences meeting, January 2019.

“Oil demand: Up the Down Staircase.” Research report for London Economics, 2018, to be published by Columbia University Center on Global Energy Policy (“CGEP”).

“New England Oil, Gas, and Power Markets” guest lecture, University of Massachusetts, Boston, MA, October 2005, with Lawrence Makovich.

“The Disappearing Middle Class: Economies of Scale in Exploration and Development,” presented at the International Association for Energy Economics, 26th annual conference, Aberdeen, June 2002.

“The Key Role of Technology in Reducing Offshore Finding and Development Costs,” *Fundamentals of the Global Offshore Industry*, The Petroleum Economist Ltd., London, September 2001.

“The US Oil and Gas Supply Situation: How Did We Get Here?” guest lecture, Clark University, Worcester, MA, October 2000.

“The Technology Revolution and Upstream Costs,” *The Leading Edge* (Journal of the Society of Exploration Geophysicists), June 2000.

Review of *Exploration, Development, and Production – Texas Oil and Gas 1970-1995*, for the *Journal of Economic Literature*, 1999.

“Resource Depletion and Technical Change: Effects on US Crude Oil Finding Costs from 1977 to 1994,” *The Energy Journal*, 1997.

“Inter-jurisdictional Competition, Resource Rents, Tax Exporting, and Oil and Gas Severance Taxes,” *The Journal of Energy Finance and Development*, 1997, with Kevin Forbes.

“Fiscal Illusion and Fiscal Sclerosis: The Case of Oil and Gas Severance Taxes,” presented at the US Association for Energy Economics/International Association for Energy Economics conference, Boston, MA October 1996.

“Prices, Depletion, and Technical Change 1977-1990: The Declining Cost of Crude Oil,” presented at the Allied Social Science Association Annual Meeting, American Economic Association/International Association for Energy Economics session, San Francisco, CA, January 1996.

“Technical Change and Scale Economies in US Onshore Oil and Gas Exploration 1977-1990,” presented at the Southern Economic Association meeting, New Orleans, LA, November 1993.

## US Department of Energy

*State Energy Severance Taxes*, DOE/EIA-TR/0599, Washington, DC, 1995.

*Oil and Gas Development in the United States in the Early 1990s: An Expanded Role for Independent Producers*, DOE/EIA-0600, Washington, DC, 1995, with Jon Rasmussen.

*"Trash to Energy: A Burning Issue," 1988 Selected Papers and Presentations by DOE's Policy Integration Staff*, US Department of Energy, Office of Policy, Planning and Analysis, Office of Policy Integration, Washington, DC, December 1988, with Peggy Podolak.

## IHS/CERA Publications

*Global Prospects for Shale Gas: Assessing Above-ground Risks and Enablers* IHS CERA Private Report 2013

*The Impact of Technology on US Offshore Finding and Development Costs* IHS CERA Private Report 2013

*The Next E&P Hotspots: What are the Leading Indicators?* IHS CERA Decision Brief 2012

*Taking the Shale Gale International: Lessons from North America* IHS CERA Decision Brief 2012

*Prospects for Shale Gas in Europe: Insights from CERAWEEK* IHS CERA Insight 2012

*Envisioning a Long-term Future for Coal* IHS CERA Insight 2011

*North American Power Industry Landscape 2011* IHS CERA Decision Brief 2011

*Common Ground? CERAWEEK Perspectives on US Electric Power Transmission* IHS CERA Insight 2010

*North American Power Industry Landscape 2010* IHS CERA Decision Brief 2010

*Mexico's Road to Renewable Power: The Cost of a Range of Targets and Options* IHS CERA Decision Brief 2009

*Competitive Bidding: A Key Tool for Capital Formation in the US Power Sector* IHS CERA Decision Brief 2009

*Financing the Global Power Business: Insights from CERAWEEK* IHS CERA Insight 2009

*Concentrating Solar Power: US Demand Heats Up* IHS CERA Decision Brief 2008

*US CO2 Policy Quandary: Near-term Reductions Imply a High Carbon Price* IHS CERA Private Report 2008

*The US Energy Act of 2007: Addressing the Demand Side of Electric Power* IHS CERA Insight 2008

*Investors' Energy Monthly* December 2004 – November 2007

*Some Sail, Some Fail: Utility M&A after PUHCA* IHS CERA Decision Brief 2006

*Another Decade of Rising Upstream Costs?* IHS CERA Decision Brief 2006

*Merchant Power's Recovery: Four Dimensions of Value* IHS CERA Private Report 2006

*PUHCA Repeal and Utility M&A: One Big Obstacle Down, Many Remain* IHS CERA Decision Brief 2005

*North American Gas Monthly Briefing* January 2003 - June 2004

*Costs are Up for North American Natural Gas* IHS CERA Decision Brief 2004

*Bottom Line: A New Long-term Floor for North American Gas Prices* IHS CERA Private Report 2004

*Upstream Gas Costs and North American E&P Strategy: Avoiding the Edge* IHS CERA Decision Brief 2004

*Can We Drill Our Way Out of the (Natural Gas) Supply Shortage?* IHS CERA Decision Brief 2003

*Cost-effective Deepwater Development: Seeing the Forest from the "Trees"* IHS CERA Private Report 2001

*Optimization and the Role of R&D* IHS CERA Decision Brief 2001

*Upstream Spending Plans: Inflation in the Pipeline* IHS CERA Alert 2001

*Upstream Technology on the Horizon* IHS CERA Decision Brief 2000

*Upstream Costs--Why the Gap will widen* IHS CERA Decision Brief 1999

*The Impact of Falling Oil Prices on Upstream Operations* IHS CERA Decision Brief 1998

*The Technology Revolution and Upstream Costs* IHS CERA Private Report 1998

*Managing the Rig Shortage* IHS CERA Decision Brief 1997

## **SPEAKING ENGAGEMENTS:**

### **News Media**

“Upstream oil costs on the rise” (excerpts from *Another Decade of Rising Upstream Costs?* IHS CERA Decision Brief 2006), *The Wall Street Journal Morning Brief*, June 28, 2006.

“Unnatural Gas Prices,” live television interview for CNN-FN, December 23, 2003.

### **IHS/CERA CERAWeek Roles**

Chairman, Coal Plenary *Envisioning a Long-term Role for Coal*, March 10, 2011

Chairman, Strategy Session *Financing the Power Future*, March 10, 2011

Chairman, Expert Dialog *North American Gas and Power Scenarios Wildcards*, March 9, 2011

Chairman, Strategy Session *Financing a North American Power Sector in Transition*, March 12, 2010

Panelist, CERA Insights *Global Power Outlook*, March 12, 2010

Chairman, Strategy Session *US Electric Power Transmission: The Battle of the Jurisdictions*, March 11, 2010

Chairman, Critical Issue Forum, *Financing the Power Sector in a Turbulent Economy*, February 12, 2009

Chairman, Critical Issue Forum *Power Sector Investment: Global Capital, Local Strategies* February 15, 2008

Panelist, Leadership Circle *Global Power Outlook* February 14, 2008

Chairman, Critical Issue Forum *Rising Costs and the Outlook for North American Gas*, February 14, 2007

Host and Commentator, *Reception for Institutional Investors* February 13, 2007

Panelist, Critical Issue Forum *Oil Sector Finance: The Cliff behind the Clouds?* February 13, 2007

Host and Commentator, *Reception for Institutional Investors* February 7, 2006

Chairman, Critical Issue Forum *Financing the Oil Future: A Three-Trillion Dollar Dilemma* February 7, 2006

Host and Commentator, *Reception for Institutional Investors* February 15, 2005

Chairman, Critical Issue Forum *North American Natural Gas: E&P in a Mature Region* February 11, 2004

Chairman, Expert Briefing *North American Gas E&P Strategy: Getting off the Treadmill?* February 12, 2003

Panelist, Expert Briefing *Bracing for a Wild Ride: North American Gas Market Outlook* February 11, 2003

**KEY QUALIFICATIONS:**

Julia Frayer is a Managing Director with London Economics International LLC (“LEI”), specializing in economic analysis and evaluation of infrastructure assets, such as power plants, natural gas-related infrastructure, electricity transmission and distribution systems, and utilities, as well as market design and expert economic advisory services for regulated and competitive power markets. She has worked extensively in the US, Canada, Europe, and Asia in valuing electricity generation and wires assets, water and wastewater networks, as well as gas transportation assets. She also provides expert advice on market rules, innovative rate design, and institutional best practices for management of infrastructure assets.

Julia manages LEI’s quantitative financial and business practice area, and also specializes in market and organizational design issues related to electricity. In addition to electric generation sector market power and anti-trust analysis, sample projects include cost of capital estimation; rate-setting analysis; short- and long-term forecasting of wholesale power prices; valuation of generators and vertically-integrated utilities; assessment of retail market design including provider-of-last resort portfolios and contracts; design of energy sales agreements; and advisory on structuring request for proposals and sale processes for energy assets and derivative contracts. As part of these analyses, Julia and her team of economists and consultants have developed and applied proprietary real-options based valuation tools, portfolio risk analytics, models of strategic bidding behavior, and sophisticated power system simulation tools, as well as customized econometric models. Julia also leads many of the firm’s regulatory economics projects, spanning such diverse issues as cost-benefit analysis, market power mitigation, tariff ratemaking, auction design (including competitive solicitations for procurement), wholesale market rules design, productivity analysis and efficiency benchmarking.

Prior to joining LEI, Julia was working as an Investment Banker with Merrill Lynch in New York.

**EDUCATION:**

Boston University, Boston, MA, B.A. in Economics and International Affairs.

Boston University, Boston, MA, M.A. in Economics.

**EMPLOYMENT RECORD:**

<b>From:</b> 1998	<b>To:</b> present
<b>Employer:</b>	<i>London Economics International LLC, United States</i> Managing Director

## PROJECT EXPERIENCE:

The projects briefly described below are typical of the work Julia has performed throughout her career at London Economics International.

### Written and Oral Testimony

- ***estimate of a stranded cost obligation payment:*** LEI was retained by Tipmont REMC, an Indiana-based electric distribution cooperative to provide independent expert analysis regarding the potential stranded costs Tipmont may need to pay to its current generation and transmission (“G&T”) cooperative, Wabash Valley Power Association, Inc. for terminating supply service. LEI applied the FERC formulaic approach to estimate the revenue lost for the G&T cooperative based on guidelines developed in FERC’s Order No. 888. LEI’s analysis was filed with FERC pursuant to a Section 205 reply filing. [FERC Docket No. ER20-1041]
- ***rate impact analysis and study of costs and benefits of municipalization:*** LEI was retained by the Maine Public Utility Commission to fulfill a legislative mandate to study proposed legislation that would involve municipalization of the state’s transmission and distribution networks. LEI submits its expert report for the Legislature on February 15, 2020 and testified before the Joint Standing Committee on Energy, Utilities and Technology on February 26, 2020. [MPUC Docket 2019-00280]
- ***expert witness in a performance-based ratemaking case for a gas LDC:*** LEI was retained in early 2019 to conduct Total Factor Productivity and Benchmarking analyses for the US gas distribution industry, and provide expert technical advice to a gas utility company in Massachusetts; LEI’s analysis and expert testimony was submitted in anticipation of a performance-based distribution ratemaking application in late 2019. [DPU Docket 19-120]
- ***independent evaluation of New England Clean Energy Connect transmission project in its siting proceeding at the Maine Public Utility Commission (“MPUC”):*** LEI was retained in 2017 to advise the MPUC staff on the wholesale electricity market impacts and macroeconomic effects of the new transmission project on Maine’s economy and the economies of other New England states. LEI prepared an independent forecast of future energy and capacity market benefits, carbon emissions reductions, and local GDP and employment impacts as a result of the construction and operations of the project; LEI also critically reviewed the submission of other parties on this topic. After providing written testimony, LEI staff led by Julia Frayer testified at the MPUC in late 2018. [MPUC Docket 2017 – 00232]
- ***evaluation of the rate impacts associated with bankruptcy-related settlement for PREPA:*** LEI was engaged by the Committee of Unsecured Creditors to consider the implications of a proposed settlement with bondholders put forth by the Financial Management and Oversight Board of Puerto Rico and various other parties. LEI’s analysis focused on the impact that the settlement would have on the rates for electricity service that the Puerto Rico Electric Power Authority (“PREPA”) would need to charge its customers. LEI also examined the likely impact on electricity demand, taking into account the increase in rates due to the settlement. LEI performed a detailed review of the current and projected costs of service for PREPA, based on certified Fiscal Plans released by PREPA and other documents related to future investment needs. LEI also studied how rates in Puerto Rico compared to other island systems. LEI’s analysis was filed with the bankruptcy court in late 2019. [Case No. 17-04780]

- ***provided independent assessment of Alberta's Comprehensive Market Design:*** LEI provided a critical review of the new capacity and energy market design being proposed by the Alberta Electricity System Operator ("AESO") in a written report submitted, on behalf of a market participant, to the Alberta Utilities Commission ("AUC"). LEI identified criteria for evaluation of the new market design, compared the AESO's proposal against other well-established organized wholesale electricity markets, and then categorized associated rules based on an objective evaluation of both positive and negative features. [AUC Proceeding No. 23757]
- ***assessment of a state-wide energy efficiency plan and appropriateness of the avoided cost of energy supply:*** LEI was retained by the Maine Public Utility Commission ("MPUC") to provide an independent forecast of future natural gas prices, wholesale energy and capacity prices, which would be relevant for cost effectiveness analysis of future energy efficiency programs. LEI was also asked to review the multi-stakeholder report that Efficiency Maine Trust and other New England program administrators commissioned in 2014 (and 2015 Update), and subsequently in 2017. LEI staff testified before the MPUC on several occasions over the course of this multi-year engagement. [MPUC Docket 2018-00321]
- ***efficacy of distributed generation as a non-transmission solution to local transmission reliability problems:*** LEI prepared direct testimony and rebuttal testimony related to the technical efficacy and cost-effectiveness of various non-transmission alternatives and specifically distribution level solar and battery storage solution to a known reliability problem in a load pocket within Massachusetts. [Massachusetts, docket EFSB 17-02/D.P.U. 17-82/17-83]
- ***conducted non-transmission alternative study:*** LEI was hired to conduct a Non-Transmission Alternatives ("NTA") analysis for the two transmission projects, which are a component of larger transmission solution being proposed by Eversource for the Greater Hartford and Central Connecticut ("GHCC") area. The objective of the NTA analysis was to determine the feasibility and viability of other non-transmission resources - such as new generation and new demand-side resources - to be developed in lieu of these two specific transmission projects to relieve transmission reliability concerns. The NTA analysis was filed as part of Eversource's application with the Connecticut Siting Council ("CSC") for each of these transmission projects. [CSC Docket No. 474]
- ***assessment of congestion in the New York power market:*** LEI was commissioned by a coalition of community groups to prepare an independent outlook of the New York power wholesale market conditions and assess the level of congestion anticipated on major transmission interfaces within the state. LEI studied multiple scenarios to illustrate the impact of major drivers on congestion levels. LEI presented the findings at a technical conference organized by the New York Public Service Commission ("NYPSC") for the purpose of evaluating the benefits of new AC transmission projects. [NYPSC Case 12-T-0502]
- ***engaged by Eversource and National Grid to determine the economic viability of non-transmission alternatives ("NTAs"):*** LEI started the analysis by screening prospective NTA technologies based on their technical characteristics, their relevance in the New England market and their technical applicability. LEI conducted a comparative cost analysis to

estimate the levelized cost per kW-month over the economic life of each of the technologies. Finally, the most probable combinations of NTA technologies identified in the selection process were further evaluated based on criteria including physical constraints such as land availability, siting issue, financing hurdle, etc. This NTA analysis was conducted for three separate NTA projects that together formed a part of the overall Greater Boston Reliability Project (also known as “AC Solution”). LEI also provided oral testimony about its analysis to the Massachusetts regulator for each of these projects: Wakefield-Woburn NTA Analysis (DPU 15-140 & 15-141), Mystic-Woburn NTA Analysis (DPU 15-64 & 15-65) and Merrimack Valley Reliability Project (DPU 15-44 & 15-45).

- ***prepared total factor productivity study and presented testimony in respect of Ontario Power Generation’s (“OPG”) hydroelectric incentive ratemaking plan:*** LEI was retained by OPG to assist in the development of its first generation IRM plan, following the formulaic I-X approach. LEI prepared an industry study of TFP trends spanning the North American hydroelectric sector. LEI also recommended an inflation index, which reflected cost drivers relevant to OPG while also aligning with the regulatory precedent in Ontario. LEI testified before the Ontario Energy Board. LEI’s analysis supported the successful approval of OPG’s first generation IRM plan for its regulated hydroelectric fleet. [OEB EB 2012-0340]
- ***independent evaluation of the costs and benefits of the Northern Pass transmission project:*** LEI submitted written testimony to the Site Evaluation Committee (“SEC”) in New Hampshire on the costs and benefits of the proposed transmission project; the analysis focused on wholesale electricity market impacts as well as macroeconomic effects of lower electricity rates and infrastructure investment at the state level in New Hampshire and other states in the region; Julia Frayer also provided oral testimony as part of the SEC’s hearings on the project. [SEC Docket No. 2015-06]
- ***assisted in exploring options to expand Maine’s natural gas supply:*** LEI was engaged by the State of Maine Public Utilities Commission to assist the MPUC in evaluating options for expansion of natural gas supply into Maine (with a view to reducing the cost of gas and power to Maine customers). LEI reviewed and evaluated proposals for firm natural gas transportation service by pipeline developers. These evaluations included LEI’s review of commercial terms include in the pipeline Precedent Agreements that underpin capacity expansion projects; review of contract provisions for Firm Transportation Agreements and Negotiated Rate Agreements; and evaluation of the status of the FERC and state-level permitting process for each pipeline proposal. The project also included natural gas network modeling (using GPCM, an industry-standard network model of the North American natural gas system) and power simulation modeling (using LEI’s proprietary POOLMod model) to arrive at a quantitative cost-benefit analysis of proposals. The Regional Analysis was an additional modeling exercise, to extend the analysis to address the impact on Maine if it were to go forward under a regional initiative to procure pipeline capacity. Testimony was filed in February 2016 and LEI testified in March 2016. [MPUC Docket Number 2014-00071]
- ***estimation of the spot market and forward market impacts around the discretionary timing of outages by large generation owner in Alberta:*** LEI prepared an independent analysis of the spot market and forward market impacts of outage scheduling practices by TransAlta over the period of 2010-2011; the analysis was filed with the Alberta Utilities Commission (“AUC”) as part of a litigated case of alleged market power abuse. [AUC Proceeding No. 3110]

- ***provided an analysis of building block incentive ratemaking approaches and their applicability to Enbridge, a natural gas distribution utility in Ontario:*** LEI's report supported the client's distribution tariff proposal submission to the Ontario Energy Board ("OEB") for a second-generation Customized Incentive Regulation ("IR") plan for the period of five years (2014-2018). The testimony set out the theory behind as well as the practical experience of using the building blocks approach in incentive regulation regimes. Julia Frayer appeared before the OEB for cross examination. [OEB File No. EB-2012-0459]
- ***testified on behalf of the NEPOOL in a jump ball filing at FERC regarding the Performance Incentive scheme proposed by ISO-NE:*** in written testimony submitted to FERC, Julia Frayer identified shortcoming in ISO-NE's proposed performance incentive scheme for its forward capacity market. [Docket No. ER14-1050 at FERC]
- ***served as testifying witness on the issue of utility joining a wholesale market:*** Julia served as testifying witness and lead author in evaluating Entergy's decision to join the Midwest Independent Transmission System Operator ("MISO") Regional Transmission Organization ("RTO") on the behalf of the Public Utility Commission of Texas. LEI evaluated several existing cost/benefit studies related to Entergy's decision to join MISO over the Southwest Power Pool ("SPP") and will be providing quantitative and qualitative analysis of specific costs/benefits attributable to ETI and its customers following membership in either MISO or SPP, including but not limited to net trade benefits, transmission cost allocation, governance issues, and continued participation in the Entergy Service Agreement following RTO membership. [SOAH Docket No. 473-12-6206; PUC Docket No. 40346]
- ***served as Independent Expert regarding Load Following Service products:*** ENMAX retained LEI to act as an independent expert on matters related to proposed auctioning for the Load Following Service ("LFS") product. LEI provided an independent evaluation of the proposed auction, including evaluation of the both the product being auctioned and the auction mechanism and key parameters. The LFS product as proposed to be auctioned was meant to represent the "shape risk" in the RRO service. LEI's evaluation considered whether the product and auction mechanism would result in an efficient, competitive and fair outcome for the Alberta market, RRO providers, potential suppliers of the auctioned product, and customers of the RRO service. LEI prepared a report titled "Independent assessment of proposed market-based determination of shape risk in RRO supply" dated January 24, 2014, which was filed in ENMAX's Application No. 1610120 before the Alberta Utilities Commission ("AUC"). [AUC Proceeding No. 2941]
- ***testimony in support of transmission operating rules and curtailment protocols for interties into Alberta:*** Julia provided testimony in support of transmission operating rules and curtailment protocols for interties into Alberta, as proposed by the Alberta Electricity System Operator ("AESO"), in order to support a fair, efficient and openly competitive power market. The testimony was made in front of the Alberta Utilities Commission ("AUC"), on behalf of Morgan Stanley Capital Group ("MSCG"), a customer of the Montana-Alberta Transmission Line. Julia's analysis considered commercial as well as operating protocols in deregulated power markets and considers how market rules incentivize new entry and produce dynamic efficiency gains related to more intense competition. The AUC issued a favorable decision to MSCG in early 2013. [AUC Proceeding No. 1633]

- ***provided testimony regarding proposed merger of two regional utilities at PURA:*** Julia provided written testimony and oral testimony at the Connecticut Public Utility Regulatory Authority (“PURA”) related to the market power consequences of proposed merger of NUNSTAR. [PURA Docket No. 12-01-07]
- ***prepared testimony and testified in support of TransAlta in relation to a settlement for contravention of FEOC Regulation related to timing of exports from 2010:*** The settlement was crafted by the Market Surveillance Administrator and filed with the Alberta Utilities Commission (“AUC”) for approval in December 2011. LEI assessed the economic and policy considerations of the settlement and its appropriateness in context of enforcement and sufficiency of penalty payment. [AUC Proceeding No. 1553]
- ***conducted RPS review:*** Pursuant to *An Act To Reduce Energy Prices for Maine Consumers*, P.L. 2011, ch.413, sec. 6 (the “Act”) , the Maine Public Utilities Commission (“MPUC”) was directed by the Legislature to study Maine’s renewable portfolio requirement established in 35-A M.R.S.A. § 3210 (3-A). LEI was engaged by MPUC to conduct an in-depth analysis of the renewable portfolio standards (“RPS”) required by the Act which would support the MPUC’s study and report to the Legislature. Julia led the team in preparation of the report, which was submitted to the Commission in January 2012 and later testified at the state legislature on the key findings of that report. [MPUC Docket No. 2011-271]
- ***provided expert testimony in support of FortisAlberta Inc. (“FAI”) in its filing for a performance-based ratemaking (“PBR”) plan with the Alberta Utilities Commission (“AUC”):*** The testimony provided detailed data analysis (including inflation and TFP trends), underpinning PBR economic theory, and reviews of best practices in various North American and International jurisdictions. The testimony offers back up elements for each of the various components of the PBR plan that is being proposed by FAI. Julia testified at the AUC in Spring of 2012. [AUC Proceeding No. 566]
- ***prepared detailed cost-benefit analysis and macroeconomic impact analysis in support of the Champlain Hudson Power Express (“CHPE”) application for siting approval at the New York Department of Public Service (“DPS” or also known as “NYPSC”):*** LEI’s analysis on economic effects was the cornerstone of the settlement agreement reached between TDI and a number of New York agencies. Julia acted as independent expert on behalf of TDI and prepared updated study results on energy market impacts, capacity market impacts and also macroeconomic benefits stemming from the operation of the CHPE project. Julia’s testimony was used in the DPS proceeding in the summer of 2012 and CHPE was successfully granted its Article VII permit. [NYPSC Case 10-T-0149]
- ***served as lead expert witness for a private equity investor in matter related to a contractual dispute regarding a long term power purchase agreement between a municipal utility located in New England and a landfill gas generator:*** Ms. Frayer analyzed key contractual terms of the PPA and provided an expert’s review of how those terms compared to the industry norm when the contract was signed and became effective. Ms. Frayer provided an independent estimate of potential contractual damages. The case was scheduled to be heard in Massachusetts Superior Court, however, Julia’s analysis helped support a successful settlement.

- ***merger analysis between hydroelectric operators:*** Julia and her team of economists supported the client in preparation of a merger application to the Federal Energy Regulatory Commission (“FERC”) under Section 203 of the Federal Power Act, in conjunction with the client’s acquisition of a Maine-based hydroelectric generation portfolio. LEI performed a full Delivered Price Test analysis for the ISO New England control area. LEI’s analysis was filed with FERC and the Merger Application was approved in early 2013; market-based rate authority was subsequently granted in mid-2013. [FERC Docket No. ER13-1613]
- ***merger analysis in support of the NRG, Inc. and GenOn merger:*** LEI staff, under Julia’s direction and guidance, performed Delivered Price Tests analysis for the Federal Energy Regulatory Commission (“FERC”) under Section 203 of the Federal Power Act and submitted extensive analysis to FERC in the summer of 2012. The Merger Application was successfully approved by FERC in December 2012. Subsequently, LEI assisted the client in preparation of the 205 market-based rate authority analysis. [FERC Docket No. EC12-134]
- ***provided expert testimony before FERC related to Shell Energy’s sale of capacity commitments from facilities in New York to New England in an alleged market manipulation case:*** Julia examined market rules, operating procedures, and pricing arrangements in New England and New York at the time of the investigation, and examined the participation of Shell in the capacity markets and compliance offers in the energy markets, commenting on the economic rationale behind the client’s must offer strategies in the energy market for capacity compliance. [FERC Docket No. EL-09-47 and EL-09-48]
- ***advised the Coalition of Large Distributors in Ontario on 3rd generation Incentive Regulation Mechanism proceedings of the Ontario Energy Board:*** The work involved expert testimony filed with the Board with detailed analysis of the theory behind the various components of PBR system, including inflation and efficiency gains factors, treatment of capital expenditures among others. The analysis was supplemented with comparison of actual factors and indices, and determination of the more robust and appropriate indices for the Ontario’s distribution industry, including total factor productivity analysis for the sector. [OEB Docket No. EB-2007-0683]
- ***provided testimony on behalf of NRG Energy, Inc. in opposition to the proposed acquisition of NRG by Exelon Corp (Exelon):*** LEI performed a preliminary Herfindahl-Hirschman Index test for market power for all regions affected, and a Delivered Price Test, for the PJM East and ComEd regions. In addition, LEI examined Exelon’s post-merger optimal bidding strategies using our proprietary model of strategic, known as CUSTOMBid. LEI also assessed the impact of changes in the parent company Exelon’s cost of capital on the activities of the company’s two regulated subsidiaries: ComEd and PECO. LEI also estimated the impact on customer costs from potential debt downgrades following the merger, and assessed the effectiveness of Exelon’s proposed ring-fencing measures. LEI’s written evidence was filed with FERC and Pennsylvania Public Utility commission. [FERC Docket No. EC-12-134; PaPUC Docket Nos. A-2009-2093057, A-2009-2093058, A-2009-2093059]
- ***prepared testimony on cost-benefit analysis:*** Julia submitted testimony on behalf of the Staff of the Maryland Public Service Commission (“MPSC”) to the MPSC to conduct a cost-benefit analysis in relation to the proposed transaction between Constellation Energy Group, Inc. (“CEG”) and Électricité de France (“EDF”) whereby EDF would purchase from CEG a 49.99%

interest in Constellation Energy Nuclear Group, LLC (“CENG”). Benefits related to the decreased likelihood of a Baltimore Gas & Electric (“BGE”) downgrade, increased likelihood of the Calvert Cliffs expansion being completed, and several macroeconomic benefits stipulated to by EDF. Costs related to the limitation on the allocation costs of CEG corporate support services to CENG, increased risk of capital deprivation and reduced quality of service, and implications of CEG’s more aggressive nuclear development. [MPSC, Case No. 9173]

- ***assessed the costs and benefits of new transmission versus generation alternatives to the system:*** New England wholesale electricity markets were simulated in order to determine whether the Greater Springfield Reliability Project (“GSRP”) would produce economic benefits to the New England region. In order to ensure that economic benefits were not subject to the forced outage and availability schedule of the simulated energy markets, LEI simulated the energy market with 30 different random forced outage and availability schedules. Using these simulations, a distribution of results was used to calculate confidence intervals and hypothesis tests run on the results, hence increasing the robustness of our findings. The study results were used to produce written testimony to the Connecticut Siting Council (“CSC”) and oral testimony was provided in late August and early September 2009. [CSC Docket No. 370B]
- ***prepared proposal on pricing safeguards:*** In September 2005, Julia’s proposal for pricing safeguards in the wholesale market, referred to as the Peaker Entry Test, was submitted to the Public Utility Commission of Texas as an alternate to the Commission staff’s proposal initially under Project No. 24255 which was later moved to and renamed by the PUCT a Project No. 31972. In April 2006, the PUCT adopted a variant of this proposal for use as pricing safeguards – the Scarcity Pricing mechanism (as specified in the above-mentioned project). Under Project No. 29042 in September 2005, Julia looked at the Pivotal Supplier Test and supplied a critique of the PUCT staff’s initial market power mitigation proposal. In June 2005, Julia participated on panel discussing market monitoring issues, as well as market power safeguards for wholesale electricity markets. In 2004, she also provided testimony on pricing safeguards proceeding, which looked at alternative market power testing procedures for market power, analyzed implications on investment, and discussed efficiency consequences of certain bidding behavior. She also prepared and filed comment testimony and quantitative analysis on questions of market definition and market integration for the Public Utility Commission review in Project No. 29042. [In November 2005, pursuant to PUCT decision, both Project Nos. 24255 and 29042 were rolled into the PUCT Project No. 31972.]
- ***served as independent evaluator and RFP manager for the Connecticut Department of Public Utility Control’s (“DPUC”) request for proposals for incremental capacity:*** LEI was retained by the Connecticut state regulator to help realize a legislated mandate to hedge the risks of evolving capacity markets and import constraints through a competitive RFP aimed at securing incremental capacity located electrically in the state of Connecticut. LEI authored a report determining the range of investment needs that could be required in Connecticut over the next 15 years due to localized ISO-NE markets for capacity and forward reserves. LEI then designed a procurement process, including the RFP and associated contracts. The RFP solicited for that capacity from both supply side and demand side resources. LEI served as the RFP manager for the process, and provided independent evaluation services of the bids,

and recommending the winning portfolio. LEI also served as the DPUC's expert witness in the hearings approving the winning portfolio. LEI's analysis helped the DPUC successfully defend the contracts from legal appeal. [DPUC Docket No. 05-07-14PH2]

- ***testimony at FERC on market power issues on behalf of intervenor in proposed Exelon-PSEG merger per Section 203 of the Federal Power Act:*** In May 2005, Julia provided direct and supplemental testimony outlining key considerations relating to the potential for adverse competitive effects in light of the proposed merger and recommended additional mitigation measures to cure horizontal market power concerns through independent analysis of merger's impact on wholesale energy and capacity markets in PJM. [FERC Docket No. EC09-32]
- ***prepared MBR authorization:*** In the matter of Hawk Nest Hydro LLC acquisition of Hawk Nest-Glen Ferris Hydroelectric Project Julia and the LEI team prepared the MBR Authorization for the FERC filing. [FERC Docket No. ER06-1446-000]
- ***testimony regarding confidentiality of long range supply and demand forecasts by California utilities:*** LEI represented the California Energy Commission ("CEC") staff in a CEC and in a state regulatory proceeding at the California Public Utilities Commission ("CPUC") in respect of the merits of making public the investor owned utilities long range energy and capacity supply forecasts, as part of the integrated resource planning process. LEI served as an independent expert and supported the CEC in successfully arguing for the release of certain information, despite the utilities' assertions that such data would undermine competitive markets. [CPUC Rulemaking No. 05-06-040]
- ***provided testimony regarding the price elasticity of demand for transmission service:*** In the context of a transmission rate case for Hydro Quebec TransÉnergie, and consideration of alternative transmission rate designs, Julia led an economic analysis on behalf of Brascan Energy Marketing, Inc. that examined the impact on trade from increased transmission costs, involving multi-factor regression analysis of nodal electricity prices, price spreads across markets, and interchange flows (imports and exports) across borders. Julia also considered the impact of the elasticity of demand for transmission services between Canadian provinces and US markets in the Northeast for maximizing revenues in rate setting. Julia presented oral testimony at the Régie de l'Énergie du Québec. [Dossier R-3549-2004]
- ***served as Independent Monitor in a multi-state renewables solicitation process:*** Julia was part of a consortium that served as the Independent Monitor for PacifiCorp's renewable solicitation process for the 2008R-1 solicitation process for additional renewable power supplies. The Independent Monitor reported to the Utah Public Service Commission ("Utah PSC"), but filings were also made with the Oregon regulator. This process included review and assessment of the solicitation process, documents, and modeling methodologies; valuation of the bidder pre-approved process; development of review criteria, monitoring, auditing, and validation of bid evaluation process; bid evaluation; contract negotiation. [Docket No. UM1368]
- ***monitored power procurement processes for Connecticut Light & Power:*** The Department of Public Utility Control retained the services of LEI to assist the DPUC in monitoring the power procurement processes for Connecticut Light & Power's (CL&P) Transitional Standard Offer

auction in November 2004 for services in 2005 and 2006, and once again selected LEI in September 2005 to monitor the November 2005 auction for services in 2006. Julia led LEI's team in providing advisory services to the DPUC, including guidance on communications protocols, design of sales contract agreement (between CL&P and winning bidders), and also valuation of final bids vis-à-vis the forward market alternatives available to the utility. In November 2004 and 2005, Julia filed an affidavit after completion of the procurement process which the Commissioners used to approve the process and the contracts between CL&P and the winning bidder. [DPUC Docket No. 03-07-18PH02]

- ***performed market power analysis:*** Bear Swamp Power Company LLC (a pumped storage generation unit) asked LEI to perform a market power analysis in conjunction with Bear Swamp's application for market-based rate authorization. A similar study was done for Carr Street Generating Station L.P., Erie Boulevard Hydropower L.P., Brascan Power St. Lawrence River LLC, and Piney and Deep Creek LLC. [FERC Docket No. ER05-639 et al]
- ***prepared expert testimony related to horizontal market power considerations:*** In support of various acquisitions by IPPs spanning many years, Julia has prepared expert testimony for filing with FERC, related to Market-based Rate Authorization applications, Triennial Reviews, and Section 203 (merger) applications. LEI has a 100% track record in getting its clients' applications for market-based rate authority and/or mergers approved by FERC.

### **Market design work**

- ***analysis of different wholesale market mechanisms:*** as part of LEI's multi-client regional market analysis program ("Continuous Modeling Initiative"), LEI staff conducted a cross-market analysis of how various market designs can accommodate increasing volumes of intermittent resources and retirement of conventional, dispatchable fossil fuel fired resources. LEI also evaluated development/siting and operations of new dispatchable resources, including energy storage to support a decarbonized electricity sector.
- ***Evaluation of wholesale market design efforts by ISO-NE to address fuel security/winter-time energy reliability issues:*** LEI staff assisted the Massachusetts Attorney General's Office in 2018 to evaluate market design fixes being proposed by ISO-NE staff as well as other NEPOOL market participants. In early 2019, LEI has also made a counterproposal for a new seasonal energy storage-based ancillary services product and adjustments to the existing capacity market design. ISO-NE is proposing market rules changes to FERC in 2020.
- ***prepared an independent white paper reviewing the merits of various expert's positions with respect to re-design of the competitive retail market in New York and imposition of price caps on competitive retail providers based on the embedded costs of incumbent utilities:*** LEI staff, led by Julia, reviewed the competition-related testimony of various experts in the retail case proceeding before the NY PSC and provided an independent critique of the substantive arguments (and flaws thereof). LEI concluded that certain other testifying experts mis-defined the market for competitive retail services, and mis-applied standard concepts in competition theory and anti-trust policy. LEI proposed alternative theories for observed price differences and customer switching trends.
- ***provided independent guidance to Alberta stakeholders on electricity market reforms in the face of evolving environmental and electricity industry policy:*** LEI supported the largest

independent power producer in Alberta through the initial negotiations around climate change policies, including introduction of a renewable investment program, coal generation settlement, carbon taxation, and design of a capacity market. More recently, LEI has been involved in nearly two years of industry consultation and stakeholdering on what kind of capacity market design to introduce in the Province. LEI staff work closely with several industry participants, and have presented at AESO-led working groups on a variety of issues, including the setting of the demand curve, and market power rules and regulations.

- ***prepared a White Paper to identify and debunk the myths about transmission investment and prove the truth with real-world cases studies.*** In order to offer a more accurate portrayal of the need to invest in transmission infrastructure, the White Paper concluded with recommendations for practical and feasible improvements to the process of evaluating transmission projects. The paper is publicly available at [www.wiresgroup.com](http://www.wiresgroup.com).
- ***advised private clients on the intersection of state and Federal policies in wholesale market rules and specifically MOPR-related issues in organized capacity markets:*** LEI modeled the latest proposals from PJM and stakeholders on its evolving MOPR design, and compared and contrasted the rules with ISO-NE's FERC-approved solution for dealing with investments mandated by state policy (e.g., CASPR). LEI advised clients on FERC strategy and discussed opportunities for existing resources to enhance end-of-life economics via the CASPR.
- ***presented to the NY Public Service Commission ("PSC") regarding NYISO's proposed changes to the energy market to include social cost of carbon:*** LEI advocated in committee meetings for neutrality of treatment between imports and local resources in setting of the carbon bid adder.
- ***conducted an empirical analysis of market design change to the Forward Capacity Market to align with states' clean energy initiatives:*** Specifically, LEI examined the Competitive Auctions with State Policy Resources ("CASPR") proposal from ISO-NE. The CASPR proposal involves adding a second or "substitution" auction to the current Forward Capacity Market ("FCM") framework. LEI examined the fundamentals for this substitution auction and integrate it within Contractor's overall FCM model. LEI evaluated the financial incentives for incumbent (existing) resources to remain in operation versus the financial incentive to retire (and therefore the bidding strategy of these resources). LEI considered critically the tradeoffs that existing generators will be making in the face of the substitution auction, including the opportunity/risk of continuing to operate versus the opportunity/risk of submitting a retirement bid and participating in the substitution auction.
- ***performed economic advisory in a matter relating to market design strategy for a large Canadian generator:*** LEI performed a case study-oriented comparative review of energy-only and energy and capacity markets in North America and abroad, with lessons learned from other jurisdictions. LEI's work plan called for the simulation modeling of three forms of market design: an energy-only market, an energy and capacity market akin to Grid of the US RTO markets, and a hybrid market with long term contracts and a spot market for capacity. The third phase involved the creation of a customized tool for future analysis, based on the simulation modeling results.
- ***provided expert insight on capacity performance schemes, on behalf of NEPOOL:*** LEI was retained by NEPOOL to provide expert insight into the proposed Performance Incentives

scheme for ISO New England's Forward Capacity Market. LEI considered the implications for generators' risk profiles and ultimately the costs to consumers. LEI's report was filed with FERC as part of the Jump Ball filing.

- ***advised client on electricity capacity product:*** LEI advised the California Energy Commission and other stakeholders on the design and development of a web-based software system supporting the trading of an electricity capacity product tracked by state regulators in connection with resource adequacy requirements. LEI analyzed similar systems in other jurisdictions, defined potential core functionalities of the California system – including, for example, posting of bids and offers. The engagement also required LEI to track titles, examine bilateral and/or multi-lateral trades and compliance reporting. LEI conducted a survey of industry participants to identify required and desired system capabilities.
- ***market design in support of electricity sector restructuring in Greece, specifically consideration of alternatives to physical divestiture of generation assets:*** On behalf of PPC, the government-owned vertically integrated national utility, LEI examined the following options: virtual power plant (“VPP”) auctions, contract for difference (“CFD”) and physical energy swaps. In case study format, the various options were compared against the following criteria: instrument objective, contract structure, contract terms, sale platform, settlement structure and the extent of physical control right transfer. Real-world experience from France, UK, Belgium, Denmark, Netherlands, Australia, and Alberta (Canada) helped shape the discussion of comparative advantages and disadvantages, taking into account the unique concerns for Greek policymakers.
- ***conducted modeling and forecasting related to the Alberta government's recent announcements to transition to a capacity market and continue meeting its carbon emissions reduction plans:*** as part of this engagement, LEI developed several scenarios that evaluated the impact of various policy and market related changes in the Alberta market on incumbent and new generators in the province. These changes included market design (energy only or energy & capacity market), plants' retirements/repowering plans, varying carbon tax regimes and different renewable investment targets. Results from these scenarios were designed to identify specific operational and regulatory risk for the client and develop a strategic best-response to optimize the client's portfolio in light of these uncertainties.
- ***advised on Strawdog related to estimation of market harm:*** LEI was retained by a market participant in Alberta to develop comments on MSA's Strawdog for the Framework for the Assessment of Market Harm. More specifically, LEI was asked to comment on the economic issues associated with the proposed Strawdog pertaining to the definition of harm in the context of Alberta's market design and the impact of the implementation of the Strawdog on wholesale power market design, market manipulation and market power abuse.
- ***prepared white paper for Canadian electricity regulators and utilities on the comparative advantages and drawbacks of various tariff-setting regimes, from performance-based regimes to cost-of-service:*** This project involved a general overview of tariff-setting practices across Canadian provinces as well as highly detailed Canadian and international case studies and an examination of the key-lessons to be learned from each case. Detailed case studies covered the tariff-setting regimes in place in the UK, the Australian National Electricity

Market and the Netherlands. As part of its deliverables, two workshops were conducted with a variety of regulators and utilities.

- ***conducted a capacity market modeling exercise to evaluate the potential impacts of different resource adequacy mechanisms:*** LEI was engaged by a major US utility where the objective of the study was to identify a market design that would provide the maximum profits at the lowest possible risk, including market and regulatory risk. LEI modeled market prices, market revenues, and gross profits under three supply-demand scenarios and tried to simulate the impact of market intervention policies on such market revenues in order to understand the potential risks and benefits to the client's baseload fleet under different market designs.
- ***provided economic advisory on market power mitigation tests for a large US-based utility:*** LEI consulted on market design features related to a proposed nodal market, including most significantly the market power analysis framework. LEI proposed strategy and is assisting in the development of an implementation framework for the local market, including prepared reports for the market design team and state commission. In addition, the approach will be proposed for federal review at FERC.
- ***conducted review of capacity market rules:*** DECC was interested in whether US power markets evaluate generation bids based on criteria other than the price bid, specifically, if the length of contract had a role in the auctions. LEI reviewed capacity market rules for PJM, ISO-New England and the New York ISO. LEI also examined whether and for how long a "lock-in" options for the first-year capacity price is offered to new generation assets bidding into the auctions. LEI also reviewed international spectrum auctions, North American gas transmission open season rules, and international auctions for toll roads to examine whether and how duration or length of contract is incorporated into bidding rules and auction clearing processes.
- ***provided a comprehensive analysis of the proposed market power mitigation measures for Alberta's electricity market for a major utility:*** Julia and her team looked at various scenarios and presented the likely outcomes given various generation portfolio configurations under each proposal and whether these mitigation measures will result in the desired results. Led by Julia, the LEI staff made a case that more rigorous and robust approaches are needed than the proposed measures. Additionally, Julia's team conducted a comparative analysis of the procurement processes and compensation schemes of the different ancillary services products in eight markets, namely: New York, New England, Pennsylvania-New Jersey-Maryland, Texas, UK, Alberta, Australia, and Ontario. The results of this analysis were used to support the client in the Alberta's stakeholder process to redesign a system operator's procurement process.
- ***authored paper on a virtual power plant auction format:*** Julia and the LEI team prepared a white paper outlining the concept of a Virtual Power Plant product and auction format, as part of a multi-consultant engagement in support of restructuring of the Greek power sector.
- ***prepared and filed testimony and quantitative analysis on questions of market definition and market integration:*** In June 2005, Julia participated on a panel discussing market monitoring issues, as well as market power safeguards for wholesale electricity markets. In 2004, she also provided testimony on pricing safeguards proceeding, which looked at

alternative market power testing procedures for market power, analyzed implications on investment, and discussed efficiency consequences of certain bidding behavior.

## **Electricity and Natural Gas Asset Valuation and Transaction Advisory Work**

- ***macroeconomic benefits of the development of Compressed Air Energy Storage (“CAES”)***: LEI was engaged by a developer to analyze the local economic development benefits associated with the construction and operations of a CAES project at the site of the soon-to-be-retired Intermountain Power Project plant in Millard County, Utah (the “Project”) using the REMI PI+ model. LEI analyzed the macroeconomics impacts from the construction and operations of the proposed CAES project, as well as the coal plant replacement, new gas plant additions, and property tax payments associated with the project.
- ***analysis of wholesale power supply options***: LEI was retained by a Midwest electric distribution cooperative to review and evaluate alternative options for securing supply, either with third-party energy service provider or directly from the MISO-administered power markets. LEI reviewed and analyzed offer(s) from energy service providers and benchmarked the offers against long term contracts on file with FERC through the Electronic Quarterly Report. LEI also advised the Board of the electric distribution cooperative on pertinent market rules and wholesale market costs that would apply to their customers.
- ***evaluation of the rate impacts associated with bankruptcy-related settlement for PREPA***: LEI was engaged by the Committee of Unsecured Creditors to consider the implications of a proposed settlement with bondholders put forth by the Financial Management and Oversight Board of Puerto Rico and various other parties. LEI’s analysis focused on the impact that the settlement would have on the rates for electricity service that the Puerto Rico Electric Power Authority (“PREPA”) would need to charge its customers. LEI also examined the likely impact on electricity demand, taking into account the increase in rates due to the settlement. LEI performed a detailed review of the current and projected costs of service for PREPA, based on certified Fiscal Plans released by PREPA and other documents related to future investment needs. LEI also studied how rates in Puerto Rico compared to other island systems. LEI created a detailed long-term model of rate impacts where the rate impacts were dynamically affecting also consumers’ willingness to purchase electricity from the grid. and PREPA’s customers.
- ***Grid of the Future study***: LEI was retained by a regional utility to assess the dynamics in the wholesale market through 2050, given aggressive decarbonization goals of the states in the region, changing supply mix, and evolving consumer attitudes (and interest in DERs and self-supply). LEI began the project with a meta-survey that analyzed and compared research findings from over 100 studies, in order to develop inputs and assumptions into the simulation-based economic modeling. Scenario-based analysis was used to then consider the variety of uncertainties about future supply and demand conditions, as well as policies affecting the wholesale market out to 2050.
- ***analysis of the long term costs and benefits in the formation of a state power authority***: LEI was retained by the Maine Public Utilities Commission to analyze the short- and long-term costs and benefits of Maine’s new legislation (L.D. 1646) which will establish the Maine Power

Delivery Authority ("MPDA"). LEI examined the legal, regulatory, technical, financial and operational issues related to the L.D. 1646 proposal and its implementation, assessed the anticipated impacts on electricity rates. The results of LEI's findings will be presented to the Maine Legislatures' Joint Standing Committee on Energy, Utilities and Technology.

- ***open solicitation for an inter-regional HVDC transmission project:*** LEI was retained to design a multi-phased open solicitation for electric transmission capacity on a proposed inter-regional transmission project in the Midwest. LEI will also serve as the Independent Evaluator during the open solicitation process, in order to ensure that FERC requirements are met for the allocation of transmission capacity in a fair and non-discriminatory fashion.
- ***wholesale market supply strategy:*** LEI was retained by a rural electric cooperative to assist it evaluating wholesale market supply options. LEI prepared Board presentation materials that describe wholesale market rules and future opportunities. LEI also provided support to the rural electric cooperative in its efforts to identify competitive supply options.
- ***valuation for a cogeneration project:*** LEI assisted a private equity firm with valuation of a large urban cogeneration facility in the Northeast US. LEI developed a dispatch profile and calculated all electricity, steam, environmental, and maintenance revenues and costs to determine the gross margins of the plant for the next 20 years; LEI's analysis was prepared for purposes of independent asset valuation.
- ***analyzed opportunity for a transmission tariff rebate based on going forward financial viability of a customer:*** LEI was engaged by Emera Maine, a transmission utility in Maine, to assess the financial viability of a customer to continue to operate several power plants in coming years with and without a transmission tariff rebate. LEI's analysis supported public discussions regarding the transmission rebate and a FERC filing by Emera Maine.
- ***evaluation of the benefits of a new pumped storage project in Canada:*** LEI prepared independent economic analysis analyzing the profits to the developer and the benefits to society stemming from the development of a new pumped storage hydroelectric project. LEI measured energy price impacts, simulated operation of various ancillary service markets (given the flexible nature of the pumped storage to provide regulation and operating reserves), and also consider ramping and inertia attributes of the project to the system. Lastly, through its power market simulation software, which considered the volatile nature of intermittent renewable generation, LEI also considered the resource adequacy and reliability attributes of the project from a public benefit perspective. LEI's analysis also considered how this particular investment would compare with other potential dispatchable generation and alternative energy storage technologies.
- ***prepared a tutorial on power markets:*** For a client looking to acquire an asset in New York City, LEI prepared a tutorial on power markets tailored specifically to market rules and market drivers of electricity, capacity, and ancillary services markets in the city
- ***assisted with the evaluation of an investment in a new gas-fired power project in Alberta:*** LEI created a Baseline forecast for the Alberta market to allow the client to evaluate the energy & capacity market dynamics in the Province, which was paired with detailed reporting for the financial and operational details for the client's project. In addition, LEI also created two sensitivities to assess the upside and downside opportunities.

- ***conducted due diligence of a potential asset acquisition in MISO-South:*** LEI reviewed the contracts and financial analysis, with specific focus on the assumed market value of capacity in the long term, and locational marginal prices for energy. LEI also reviewed certain contracts and supporting materials, and participated in due diligence calls.
- ***retained by large private equity firm to present a market overview of the markets where it owns generation assets:*** These markets include PJM, New York, New England, ERCOT, and SERC. In addition to this, LEI presented an investment opportunity presentation to senior management.
- ***consulting services and forecasts related to avoided energy supply costs:*** LEI conducted an empirical analysis of proposed key New England wholesale electricity market design change to the Forward Capacity Market, which, included long term modeling of the New England energy and capacity markets. Specifically, LEI examined the Competitive Auctions with State Policy Resources (“CASPR”) proposal from ISO-NE. The CASPR proposal involves adding a second or “substitution” auction to the current Forward Capacity Market (“FCM”) framework. LEI examined the fundamentals for this substitution auction and integrate it within Contractor’s overall FCM model. LEI evaluated the financial incentives for incumbent (existing) resources to remain in operation versus the financial incentive to retire (and therefore the bidding strategy of these resources). LEI considered critically the tradeoffs that existing generators will be making in the face of the substitution auction, including the opportunity/risk of continuing to operate versus the opportunity/risk of submitting a retirement bid and participating in the substitution auction.
- ***research paper demonstrating best practices for measuring the benefits of transmission*** for a WIRES-funded research project, LEI prepared a “how-to” guide and demonstrated its application on two hypothetical transmission projects, showcasing how system planners and other decision-makers can measure objectively the benefits of transmission investment from the perspective of various stakeholders, and also over the short- medium- and longer-term.
- ***conducted empirical analysis of key features of proposed capacity markets in Alberta and Ontario:*** LEI assisted the client in understanding the capacity market design initiatives across Canada. LEI staff presented a series of work paper on various topics, related to market mechanics and resource adequacy and setting of the demand curve. LEI also assisted the client in critical evaluation of design options from the perspective of the existing generation fleet, new entry, and consumers through detailed quantitative modeling and simulation-based analysis of the target markets.
- ***advised a major utility in Canada in its call for tenders strategy for procuring firm capacity over a long term horizon from neighboring jurisdictions:*** Julia evaluated the opportunity for purchasing capacity from interconnected jurisdictions and devising a procurement that would efficiently overcome seams issues and market design issues that attach different counting and valuation methods for capacity across jurisdictions.
- ***Design of an innovative framework for evaluating the economics, environmental, and siting costs and benefits of transmission (and generation investment) for the California Independent System Operator:*** building upon the traditional economic framework for cost-benefit analysis, the LEI team devised an approach to quantitative value the expected net benefits from various infrastructure projects, taking into account market uncertainties as well

as the classic deregulated market coordination problem of planning for transmission give uncertain generation investment and vice versa. A scoring technique for environmental permitting and siting issues was also developed, in order to quantify the potential impact of the proposed project on the local environment and economy, as well as to measure the impact of such factors on the project timetable and eventual net benefits to society. Real option techniques were also considered in this engagement to assess the potential value of uncertainty and the benefits for delaying various investment strategies. The methodology was also expanded to handle the potential to evaluate numerous competing projects, in recognition of the fact that transmission and generation investments (and other potential investments) could be both complements and substitutes.

- ***served as Independent Examiner for Western Interconnect transmission line:*** LEI was selected by developers of the Western Interconnect transmission line in New Mexico to serve as Independent Examiner for their Open Season process, through which WI offered transmission capacity over the line to any interested party at the same rates, terms and conditions as those offered to anchor customers on the line. LEI designed and managed the entire process, which included creating the evaluation criteria, drafting announcements and press releases, preparing the Open Season documents and forms, conducting information sessions, overseeing the process website, and evaluating and ranking bids. At the conclusion of the process, LEI prepared and submitted a report to FERC (in docket ER15-2647) attesting that the process was market-driven, fair, transparent, and non-discriminatory.
- ***capacity price review on auction bidding:*** The UK market regulator was interested in whether US power markets evaluate generation bids based on criteria other than the price bid, specifically, if the length of contract had a role in the auctions. LEI reviewed capacity market rules for PJM, ISO-New England and the New York ISO. LEI examined whether and for how long a "lock-in" option for the first-year capacity price is offered to new generation assets bidding into the auctions. LEI also reviewed international spectrum auctions, North American gas transmission open season rules, and international auctions for toll roads to examine whether and how duration or length of contract is incorporated into bidding.
- ***provided independent market analysis to clients interested in understanding the implications of expansion of natural gas supply into New England:*** LEI began with a review and evaluation of the numerous proposals for pipeline expansions. LEI staff also performed natural gas network modeling (using GPCM, an industry-standard network model of the North American natural gas system) and power simulation modeling (using LEI's proprietary POOLMod model) to arrive at a quantitative impacts assessment of various projects on the Northeast gas markets and electricity markets.
- ***conducted cost of electricity comparisons across Canada:*** LEI was engaged by a consortium of private companies to estimate and compare the delivered cost of electricity for all Canadian provinces over the 2011-2015 timeframe: In addition, LEI also forecasted how the delivered cost of electricity in Alberta could develop over the next fifteen years (2017-2031) under the Climate Leadership Plan ("CLP"). LEI forecasted energy, transmission, and distribution rate components, using three modeling scenarios in addition to a Base Case, evaluating different assumptions for renewable investments, demand levels, and reserve margin targets. The Base Case and scenarios were designed to inform the general public about the impacts of various

policy and market-based interventions on the delivered cost of electricity to consumers in Alberta in the future.

- ***conducted gas price forecasting:*** For a private equity client, LEI forecasted the energy and capacity revenues of various gas-fired plants in PJM for a 20-year period. More specifically, LEI projected the energy and capacity prices, plants' annual generation, load factor, and operating costs. LEI's analysis influenced the client's going forward investment decisions.
- ***price forecasting for wind facilities:*** LEI analyzed the revenue potential for wind facilities in CAISO, SPP and PJM, developing price forecasts through 2045 and also assessing market rules to identify any potential penalties that may apply to intermittent generation and deviations from generation profiles. Three cases of merchant forecasted revenues, Base Case, High Case and Low Case, were developed in order to identify key uncertainties and opportunities.
- ***served as Independent Examiner for a proposed merchant transmission project's Open Solicitation process:*** The project entailed designing the solicitation process, meeting with potential shippers on the line to garner early interest, drafting announcements and press releases, conducting information sessions, updating the solicitation website, evaluating and ranking bids, assisting with bilateral negotiations with shippers, and submitting a report to FERC as part of the developers' Section 205 filing.
- ***conducted independent analysis on power market in support of transmission development:*** LEI supported a major transmission developer in the Northeast US in its analysis of opportunities and market impacts from a number of potential projects to bring energy into the New England region. LEI performed independent analysis measuring the impacts of numerous project designs on the power market (including energy and capacity markets, production cost savings and environmental benefits) and local macroeconomic analysis as well.
- ***retained by private equity firm to provide 20-year monthly energy and capacity prices and operating metrics results for several CCGT plants in PJM:*** LEI reviewed plant parameters, financial model, and market consultant reports provided by the seller and delivered price forecast and dispatch results to the client.
- ***conducted New England modeling:*** LEI conducted an empirical analysis of New England wholesale electricity market dynamics, including long term simulation based of the New England wholesale market to measure energy and capacity market impacts, production cost savings, generators profitability under various future market conditions. The client used LEI's modeling results to perform policy analysis and prepare a research report that the client plans to release publicly in 2017.
- ***Alberta market analysis:*** For a major stakeholder in Alberta, LEI conducted empirical analysis to identify how change in offer behavior of some resource owners affected spot and forward markets in Alberta. LEI developed two separate econometric models (a time-series analysis for spot, and a panel (or a cross-sectional time-series) regression for forward markets) to estimate the price impacts from the change in the offer behavior, lost value in wholesale markets, and foregone revenues for key market participants. The engagement also involved a detailed analysis of historical offer bid data to determine when the offer behavior changes

occurred, and an analysis of select Alberta power plants' financial losses due to uneconomic offer behavior.

- ***conducted wind price forecasting:*** LEI used its proprietary dispatch model, POOLMod, to project energy prices in ERCOT for a wind developer undertaken financing of its projects in West Texas. LEI also examined the implications of PPA related to the two wind farms. LEI also provided energy, capacity, and solar renewable revenues for an operating solar plant in New Jersey as part of the same engagement.
- ***reviewed energy storage installations in New England:*** For a transmission and distribution company in New England, LEI analyzed the cost and benefit to consumers on different configurations of energy storage installations in the ISO-NE grid. The engagement involved modeling multiple configurations of energy storage solutions, including different storage capacity and duration, as well as various charging and discharging cycles.
- ***developed a simulation model for forecasting ancillary services revenues:*** The engagement involved analyzing the dynamics of ancillary market prices and revenue under different market scenarios. The model developed was able to simulate hourly dispatch and clearing of the ancillary services market, and was integrated with LEI's Alberta energy market model.
- ***reviewed trading activities within energy market:*** On behalf on an electricity marketer, LEI liaised with NYISO Market Monitoring & Analysis (MMA) department in respect of trading activities in the energy market.
- ***serves as Independent Examiner for a proposed merchant transmission project open solicitation process:*** The project entailed designing the solicitation process, meeting with potential shippers on the line to garner early interest, drafting announcements and press releases, conducting information sessions, updating the solicitation website, evaluating and ranking bids, assisting both bilateral negotiations with shippers, and submitting a report to FERC as part of the developers' Section 205 filing.
- ***performed analysis of HVDC transmission projects:*** LEI was retained by a transmission developer to perform a high-level analysis of the cost-competitiveness of HVDC transmission as a regulated solution with respect to generation resource. The work included comparing the revenue requirement for HVDC transmission projects with the net Levelized Cost of Entry ("LCOE") of comparatively sized and located generation resources.
- ***advised on New York transmission project:*** LEI provided advisory service to a transmission developer looking to position its project in New York. LEI provided an overview of the current regulatory and legislative framework, and assisted in identifying and targeting potential shippers on the line.
- ***provided analysis on new HVDC transmission line:*** Julia Frayer led an LEI team that provided strategic support and analysis of various regulated and unregulated business models for proposed new HVDC transmission line, including identification of potential shippers and RFP opportunities, as well as categorization of potential private and social benefits of the project
- ***advised on climate change policy in Alberta:*** LEI provided research, analytical and advisory support to a client in Canada as the Alberta government implemented its climate change

policy, which will shut down coal plants early, ramp up renewable generation, and put province-wide carbon tax in place.

- ***assisted a client to perform the competitive landscape analysis for projects participating in the Clean Energy RFP:*** LEI's competitive landscape study employed a three-step approach. At the Step I, LEI identified the potential projects that can qualify for the Clean Energy RFP and production of a matrix of competitors. The comparative analysis then graded each project from Step I, using the type of criteria listed in the evaluation and selection process section of the Clean Energy RFP. In summary, LEI's comparative analysis looked at both the (a) minimum threshold requirements and (b) the characteristics of each project relative to the quantitative and qualitative benefits enumerated in the Clean Energy RFP. Lastly, based on the rankings from the comparative analysis in Step II, LEI concluded with the SWOT analysis for the client's project relative to possible competitors and examine the relative strengths, weaknesses, opportunities, and threats in the Clean Energy RFP.
- ***provided a 20-year market outlook report for New England:*** The market outlook report was to include a 20-year regional price forecast for the energy and capacity markets, summary of recent market developments, comparison of monthly and peak versus off-peak prices, and a Tier-1 Renewable Energy Credits ("RECs") forward price forecast.
- ***reviewed NYISO due diligence materials:*** For an infrastructure investment fund, LEI reviewed due diligence materials for the client's potential acquisition of a cogeneration plant participating in the NYISO markets. LEI further performed an analysis to forecast future fuel and operating costs for the plant, revenues from the sale of energy and capacity in the wholesale markets, and revenues from the sale of steam to an off taker.
- ***analysis of congestion in the New York market:*** For a transmission project developer, LEI performed an analysis of congestion in the NY markets for proposed renewable generation resources as well as a new transmission link. LEI relied on results from a power flow study to properly model the proposed resources and transmission constraints in POOLMod.
- ***analyzed the impact of a new transmission project between upstate and downstate New York:*** LEI used its proprietary energy and capacity market simulation models to assess the impact of the proposed transmission line on New York energy and capacity markets over a 20-year horizon. LEI further prepared a forecast of revenues for potential shippers from the results of the simulations.
- ***supported a risk management assessment:*** LEI assisted in a large provincial institution in the development and assessment of alternative risk management and investment strategies for its trading and investment businesses. As part of this work LEI completed a Risk Assessment Survey of the Board of Directors as well as additional Value-at-Risk ("VaR") modeling, scenario and stress testing.
- ***conducted New England gas price forecasting:*** LEI was retained to forecast delivered gas prices in New England (Connecticut) and PJM (New Jersey) and locational marginal prices as well as retail electricity prices in Connecticut.
- ***engaged by an investment firm in association with its acquisition of a proposed natural gas-fired plant in Ohio:*** Work involved asset valuation, due diligence support and market analysis. LEI reviewed the documents in a virtual data room, and performed analysis related

to drivers of gross margin for the asset: macroeconomics, fuel and electricity cost projections, and overview of gas and electricity market in the region where the asset was located.

- ***led workshop to review New England markets:*** LEI was hired by a New England transmission & distribution utility to prepare a two-day workshop for company executives detailing the current state of the New England markets, major players across all sectors of the industry, major investment drivers and investment analysis methodology. LEI staff prepared workshop material and traveled to the client's office to present the material and answer client's questions.
- ***conducted price driver analysis on gas-fired asset:*** LEI was engaged by a private client to conduct a price driver analysis and strategy optimization exercise to enhance the bidding and dispatch strategy on a jointly owned gas-fired asset. This included a report on ISO-New England's Winter Reliability Program to identify and evaluate key wholesale price drivers in the New England region. LEI also examined the generating asset's financial data to help optimize its bidding strategy.
- ***prepared a quantitative analysis to test the efficacy of a proposed cross hedging strategy for a merchant transmission project that will be bringing energy from Canada:*** The proposed strategy is to use natural gas futures contracts to hedge energy market exposure and revenues. Analysis will include ordinary least squares regressions as well as an error correction model to determine the appropriateness of the hedge.
- ***analyzed revenue/gross margin modules for various district energy assets in Illinois being considered for acquisition:*** LEI reviewed information received from the client, including detailed documents in the data room, and presented analysis in a slide deck relating to contract revenues (prices and volumes) and fuel costs (electricity) along with revenue and cost drivers. LEI also presented sensitivity analysis for high/low sales volumes, new customers, expiry dates of existing contracts, fuel costs etc.
- ***provided due diligence analysis and support on the acquisition of a portfolio of small hydropower plants in the PJM region:*** The portfolio consisted of a mix of mini and small run-of river hydropower plants. LEI's scope of work was threefold. Firstly, LEI provided an overview of PJM RTO market, describing market fundamentals, key players, supply mix, retirements and new built, as well as discussing historical market trends. Then, LEI used its proprietary dispatch and simulation cost production model POOLMod to simulate power market dynamics and develop forecasts of energy prices in the assets' location over a 20-year horizon. As part of this modeling exercise, LEI used its in-house capacity market to develop capacity prices forecasts over a similar horizon. Finally given the conventional storage capability of one of the units, the client requested LEI to provide a description of the frequency regulation market in PJM and to determine potential revenue opportunities for the plant. LEI provided results of its modeling exercise in Excel format and prepared a slide deck summarizing key messages, key findings and recommendations to the clients.
- ***provided due diligence review on New England plant:*** LEI worked with private equity investor on an M&A due diligence review of a combined heat and power generation unit in New England. LEI provided market analysis, price forecasting services, and supported the investor in its valuation of the asset.

- ***conducted review of Maine hydro facilities:*** For an infrastructure investment fund, LEI reviewed due diligence materials for the client's potential acquisition of a portfolio of hydro facilities located in Maine, and provided an independent valuation of the projects based on forecast energy market dynamics and REC opportunities.
- ***reviewed NESCOE Gas Electric Phase Three study:*** LEI conducted a comprehensive review of the NESCOE Gas Electric Phase Three study in order to ensure that the appropriate economic models and techniques were being used to accurately model the hydro and gas solutions. LEI also aided the client in identifying any assumptions and modeling approaches which may be suboptimal, and communicated how these issues can be addressed and improved in future studies.
- ***asset valuation, due diligence support and market analysis for an infrastructure fund:*** The engagement involved reviewing documents in a virtual data room, and analysis related to drivers of gross margin for the asset: macroeconomics, weather fluctuations, fuel and electricity cost projections, and overview of gas and electricity market in the region where the asset was located.
- ***conducted market study regarding renewable generation:*** Julia led the preparation of a market study to support financing of a renewable generation portfolio in New England. The market analysis supported a successful multi-million-dollar debt raise for the client.
- ***developed HHI screens in support of a valuation of a gas-fired facility:*** LEI developed simplified HHI screens looking at summer peak period for a client's potential acquisition of a gas-fired facility in New York. Several scenarios were developed to test the impact on HHI.
- ***conducted evaluation of fair market sales value of a coal-fired unit in Arizona, as required by a lease that expires in 2015:*** Results from LEI's proprietary modeling tool, PoolMod, on market prices and dispatch were used as inputs in the financial model, which used discounted cash flow techniques. Two cases (Base Case and High Case) were created to develop a range of value with a weighted average point estimate. In addition to the discounted cash flow model, the market approach, which looks at comparable transactions, and the cost approach, which looks at the cost of building the same facility were considered.
- ***provided valuation services for a waste coal facility located in the Pennsylvania-New Jersey-Maryland ("PJM") regional market:*** Specific tasks consist of i) due diligence review of documents such as past financial statements, operational statistics report, fuel agreements and power purchase agreements ("PPA"); ii) forecasts energy and capacity prices in the PJM regional market; iii) create a pro forma financial model to evaluate the market value of the plant as of expiration of its PPA; iv) writing a final report documenting assumptions, methodologies used and modeling results.
- ***provided forecasting and modeling support for a start-up company:*** Julia and her team assisted Tres Amigas LLC, a start-up company on the revenue forecasting and modeling for the second stage financing. The start-up company aims to develop, own and operate a unique three-way AC/DC transmission facility located in New Mexico. In 2010, for the feasibility analysis stage, LEI provided extensive transmission evaluation, financial modeling, price forecasting, and market analysis for the markets, including the Arizona/New Mexico/Southern Nevada sub region of the Western Electricity Coordinating Council, the

Electric Reliability Council of Texas, and the Southwest Power Pool. LEI's analysis support over \$15 million of development stage funding. LEI continues to serve as economic advisor to Tres Amigas, as it seeks debt and equity financing to support construction of Phase I.

- ***Market power analysis as a result of a proposed merger:*** in support of a client's opposition of a proposed utility merger in the Northeast US, LEI provided a white paper analyzing the impact of the merger on competition. The white paper covers analysis on buyer market power, concerns with utility's returning to rate base generation and vertical market power.
- ***conducting forecasting for electricity generation assets in New England:*** Using LEI's proprietary simulation model of electricity wholesale markets in ISO New England, LEI forecasted future cash flows for a portfolio of electricity generation assets and applied the net present value analysis to evaluate the portfolio's economic value under different potential future market conditions. This analysis supported the investment fund's decision to acquire and hold the generation portfolio's distressed debt.
- ***led research on biomass plants regarding renewable energy revenue options:*** Julia investigated opportunities for portfolio of biomass plants to earn renewable energy revenues from RECs, capacity markets, and carbon offsets given regulations in all states belonging to MISO, PJM, and ISO-NE. Engagement also involved formulating strategies for client to optimize the generation assets' revenue potentials by exploiting the identified renewable energy opportunities.
- ***analyzed potential revenues of pumped storage hydroelectric facilities (energy, capacity, ancillary services) proposed in various locations in ISO-NE and NYISO:*** The analysis included detailed simulations of the wholesale electricity markets, application of sophisticated statistical tools to estimate the volume and the price level of various ancillary services.
- ***assisted a major Canadian renewable power company in its economic valuation of a New England based renewable company, prior to acquisition:*** Work involved due diligence, analyzing the revenue potential of the potential acquiree's assets over the 2009-18 period across all major ISO-NE product markets, and separately analyzed the market power implications of the acquisition in preparation of a potential FERC application, including analysis of market power issues in ancillary services market.
- ***evaluated potential value of assets available under various regional auctions for a dominant IPP player:*** Julia worked with the client in composing a bid proposal by assessing market risks posed by various factors, such as fuel price shifts, merchant plant construction scenarios, site conversion potential, and transmission constraints and through extensive production cost modeling.
- ***conducted an indicative valuation of a proposed new transmission line, known as the International Transmission Line:*** LEI forecasted the revenues associated with the project and combined this revenue forecast with the estimated costs of the project to arrive at an estimate of the net present value of the project and return on investment.

## **Power, Gas, and Infrastructure Sector Business Development and Strategy**

- ***“Grid of the Future” analysis of climate change policies:*** LEI conducted an impact assessment, covering a period of 2030-2050, and considering how policies and decarbonization goals will change the landscape for new supply resources; LEI also examined the impact of beneficial electrification on system demand. LEI conducted an extensive simulation-based modeling exercise that considered different capacity expansion profiles, taking account of economics of various resources, customers’ willingness to pay, policy goals, and also technical constraints relevant for each technology. The capacity expansion analysis was integrated with LEI’s energy simulation model to also factor in overall system reliability requirements. LEI supplemented the power market simulations with detailed analysis of other components of the customers’ bill, in order to consider economically rationale customer response to different possible retail rate design and options for self-supply. Results of LEI’s *“Grid of the Future”* study will be published in the second quarter of 2020.
- ***Strategic analysis of the value of on-site peakers for an Alberta industrial client:*** LEI was engaged by an industrial client in Alberta that was considering the addition of on-site gas peakers. LEI’s scope of work consisted of identifying potential technology type candidates that would suit the client’s needs, reviewing historical and projected site loads, developing a status quo estimation for the cost of delivered power rates, and finally creating a relative economic model that compared the use of on-site generation against the status quo.
- ***portfolio optimization strategy:*** LEI was engaged by a Canadian client to explore options associated with entering into a service agreement with a third-party. LEI prepared a report which identified a number of firms which could provide this service, and provided a more detailed profile of the firms which best meet the requirements of the client. LEI also acted as an independent advisor to guide the client through a process to potentially contracting with a third-party service provider.
- ***advised on policy and government framework to Malaysia client:*** LEI was engaged by Tenaga Nasional Berhad (“TNB”) to work as the project manager of its Incentive Based Regulation (“IBR”) submission for the 2nd regulatory term. LEI provided advise on the policy and government framework for the implementation of IBR, providing strategic advice to IBR Council and TNB management regarding the IBR submission, managing and monitoring the submission process, coordinating with business entities and attending IBR Council meetings, progress meetings, and challenge workshops. Moreover, LEI reviewed the current Regulatory Implementation Guidelines (“RIGs”) set by the Energy Commission and proposed enhancements to the RIGs. LEI is also currently involved in negotiations with the Energy Commission regarding proposed changes to the RIGs. LEI is also updating and providing enhancements to TNB’s Revenue Requirement Model (“RRM”) which sets the IBR tariff for each business entity. Furthermore, LEI assisted in the writing of the IBR submission report to the Energy Commission.
- ***conducted Total Factor Productivity study:*** In December 2014, London Economics International LLC (“LEI”) prepared a report for Ontario Power Generation (“OPG”) entitled “Empirical Analysis of Total Factor Productivity Trends in the North American Hydroelectric Generation Industry.” The purpose of this report was to share findings from LEI’s TFP study, which estimated TFP trends for a select group of peers from the North American hydroelectric generation industry. Data for this study covered an eleven-year period from 2002-2012. The

purpose of this new engagement is to update this study for newly available data (encompassing operating costs and other statistics for calendar years 2013 and 2014).

- ***performed a forward analysis and market simulation of potential wholesale revenues for a proposed wind project in Wyoming:*** analysis was used by developer to attract potential counterparties for a long term PPA.
- ***conducted a comprehensive cost-benefit analysis of a proposed transmission project in New England using simulation-based analysis of the ISO-NE wholesale power markets:*** LEI's analysis included detailed examination of the benefits to consumers from lower energy and capacity prices, as well as emissions reductions and local economic impacts (associated with spending during construction and lower retail costs of electricity).
- ***conducted a Non-Transmission Alternatives ("NTA") analysis for the two transmission projects, which are components of a larger transmission solution in New England:*** The objective of the NTA analysis was to determine the feasibility and viability of other non-transmission resources – such as new generation and new demand-side resources – to be developed in lieu of these two specific transmission projects to relieve transmission reliability concerns. The NTA analysis was to be filed as part of the client's application with the Connecticut Siting Council. [Docket N5179515].
- ***supported a client in administering its compliance program:*** For all the US regions where the client (international IPP) is currently active, LEI was engaged to support the client's Regulatory Group in its administering of the company's compliance program. LEI provided a monthly report covering developments by regional market and products which included: energy, capacity, long-term transmission service, FTR auctions, ancillary services, diesel oil, PRB coal, natural gas commodity, transmission, and storage, RECs, and CO2. The purpose of this monthly update was to ensure that client's transactional and business groups were made aware of market rules and regulatory risks.
- ***provided due diligence support:*** LEI was engaged by a private equity company in association with asset valuation, due diligence support, and market analysis for a wind generation and HVDC transmission project proposing delivering wind-based renewable energy from Wyoming into California.
- ***authored report on pollutants emissions:*** LEI was hired by a large Canadian IPP to prepare a report providing an overview of past and current initiatives pertaining to pollutants emissions regulation with the purpose to inform the potential paths forward for future carbon regulation in the US. The engagement was initiated following the Executive Office of the President released the President's Climate Action Plan ("CAP") to reduce greenhouse gas ("GHG") emissions, and to prepare for the impacts of climate change. Under this engagement, LEI performed a detail literature review of the President's directive, past Environment Protection Agency ("EPA") regulations, as well as exiting regional carbon reduction programs. The overarching purpose of this exercise was to estimate the potential shape of a future carbon rule in the US (with associate features such as timing, mechanisms, and regulatory framework) based on EPA's legal authority scope, procedures and lessons learned from failed or successful rules implementation. LEI identified various market-based and non-market-based regulatory frameworks/scenarios and ranked them on their relative likelihood based on a set of established criteria including affordability of the regulatory scenario, impact

on generation retirement and system reliability, alignment with EPA's precedents, congruency with Presidential directives, consistency with EPA's jurisdiction, and political palatability.

- ***evaluated the impact of the implementation of potential future Federal regulation limiting carbon emissions on ERCOT's energy markets and on Energy Future Holdings' ("EFH") portfolio:*** For a large Canadian IPP, LEI used its dispatch and simulation model POOLMod to develop forecasts of energy prices in ERCOT under a variety of potential frameworks under which carbon emissions could be regulated. The purpose of this exercise was twofold: a) evaluate the impact of a carbon rule (of any shape) on wholesale energy prices, and on the performance of the EFH' portfolios; b) determine the most impactful carbon rule regulatory framework.
- ***conducted New York price forecast:*** LEI was retained to do a 30-year (2015-2044) energy price forecast for Western New York, capacity price forecast for the Rest of the State, and revenue forecasts for a small hydroelectric plant in preparation for an asset sale process.
- ***assisted an Ontario electricity generator in performing a productivity study on their hydroelectric assets to fulfill the mandate of the Ontario Energy Board ("OEB"):*** LEI proposed a structured approach to address how productivity should be measured, what methods are available, identify a relevant peer group, and ultimately provide the client with a productivity study for filing with the OEB.
- ***reviewed client's risk management practices and provided meaningful insights with regards to the risk management related issues:*** Analysis included quantification of the magnitude and probability of risks being faced by trading and other operational activities of the client, as well as research into the best practices of other similar organizations.
- ***engaged by a global investment firm to provide a market outlook for three assets located in ERCOT:*** LEI provided a 10-year detailed market revenue forecast for the three plants under base case assumptions.
- ***provided independent review and assessment of cost-benefit analysis related to termination of certain PPAs between Entergy Texas Inc. and Entergy Louisiana:*** LEI's assessment was requested by the Public Utility Commission of Texas, as follow on to previous consultative services that LEI has provided.
- ***served as Independent Evaluator ("IE") for Pacific Gas & Electric Company ("PG&E") for PG&E Electric Fuels Department's Natural Gas Storage Services Request for Offer ("RFO"):*** Specifically, LEI worked with PG&E to ensure that Offers were evaluated consistently and appropriately in accordance with the solicitation protocol and in accordance with applicable rules and processes of the California Public Utilities Commission ("CPUC").
- ***prepared a study of the Value of Lost Load ("VoLL") in ERCOT and evaluated current utility practices for manual load shedding:*** LEI's report on VoLL was filed with the PUCT in June 2013 under PUCT Docket 40000.
- ***engaged by a Japanese research institute to research the environment for investment and financing of new generation in the US competitive electricity markets as well as the types of approaches used to manage investment risk:*** The LEI team researched the impact of market

restructuring in the US on generation investment, methods for financing new generation, and analyzed policies promoting generation investment. LEI also performed four case studies on projects that were successfully financed and built in recent years, including assets in California (CAISO), Maryland (PJM), New York (NYISO) and Texas (ERCOT).

- ***provided support to FortisAlberta Inc. ("FAI"), a Canadian electricity utility, in its filing for its capital tracker application with the regulator:*** LEI reviewed the submissions of the interveners and advised FAI on how to address the issues raised by these interveners.
- ***led a comprehensive ratepayer-focused cost-benefit study of integrating a remote service territory of a single-state utility into a Northeast RTO's footprint:*** The cost-benefit analysis looked that at the long-run the benefits of joining an RTO versus the costs of new infrastructure that would be needed to accomplish the integration. LEI's analysis was used with regulators and state policymakers to pursue a transmission investment strategy by the utility.
- ***provided a study on electricity sector unbundling in the US for a Japanese client:*** The study starts with an overview of the electricity sector unbundling in the US, including the history of restructuring and unbundling efforts, the categorization of unbundling, and the organizational impact of unbundling. Three case studies were also provided on specific unbundling experiences of TXU Corp., Commonwealth Edison, and Consolidated Edison.
- ***supported the negotiation of fuel supply and energy sales agreements for a biomass to energy facility:*** In particular, LEI's analysis focused on the appropriateness and risk associated with price and cost escalation factors. Reviewed similar power purchase agreements and analyzed a suite of available indices.
- ***counseled on transmission cost allocation:*** LEI advised Maine 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, which was used by the Maine PUC to guide it in its filings at FERC related to Order 1000 and the preceding NOPR on the same issue.
- ***served as Independent Monitor for Energy New Orleans:*** Julia acted as manager for LEI's engagement with the City of New Orleans. LEI was engaged to act as the independent monitor for Entergy New Orleans' solicitation of a Third Party Administrator to implement and deliver conservation and demand management programs on behalf of the utility. LEI provided guidance to Entergy and the City on the development of the request for proposals, including mandatory requirements and commercial terms. LEI oversaw the bid receipt as well as the review and selection process. A final report was provided outlining LEI's opinion as to the fairness of the overall process.
- ***assisted a client with certain matters pertaining to a FERC investigation:*** Specifically, the scope of this retention includes economic and market analysis in support of a market participant in ISO New England's day ahead load response program ("DALRP"). Julia also provided affidavits and deposed in connection with FERC investigation of behind-the-fence industrial generator and participation in a wholesale power market in New England. Julia

helped the client to respond to assertions of market manipulation and estimate market benefit provided through its participation in demand response program.

- ***advised a major transmission company on financial implications of proposed new 400kV transmission line to New York City and Connecticut:*** LEI analyzed the impact of new transmission, assuming it delivered 100% carbon-free energy, on electricity prices and emissions levels in New York and New England.
- ***served as an independent economic expert, opinion on specific matters related to a market participant's participation in the day ahead demand response program implemented by ISO-NE:*** LEI staff reviewed the specific facts of the case related to how the customer baseline was developed and the offering strategy of the market participant in the demand response program. LEI conducted independent analysis of the decision-making process that had been undertaken in support of the customer baseline and offer strategy. LEI also prepared an analysis of the market benefits created for the market as a whole through the demand reductions offered by the market participant (a customized VBA model was created to reconstruct day-ahead ("DAH") and real-time ("RT") energy market clearing prices using public historical hourly offer and bid data.
- ***supported a client in preparing an offer to provide new capacity:*** LEI evaluated projects submitted in the context of a competitive solicitation (RFP) for new capacity, aimed at reducing Connecticut consumers' Federally Mandated Congestion Charges ("FMCC"). LEI drafted and administered the RFP. LEI then served as an independent evaluator on behalf of the DPUC and performed a comprehensive evaluation of the proposed projects, using LEI's proprietary production cost model, POOLMod. Julia testified at the Connecticut Department of Public Utility Control ("DPUC") regarding the RFP process and recommended selection of winners and award of contracts.
- ***authored FERC addendum:*** Julia wrote the report that served as an Addendum to the market power analyses that were filed with FERC in Docket No. ER05-665-001. The objective of this Addendum was to address the items requested by FERC in the deficiency letter issued on June 23, 2005 in this docket.
- ***managed theoretical analysis and quantitative simulation modeling in the design and testing of recommended new regulatory regime:*** Analysis and recommendations were presented to stakeholders.
- ***conducted market assessment:*** For a major Canadian utility, Julia undertook a comprehensive market assessment of the New England REC markets, and specifically the Massachusetts and Connecticut markets, under three different scenarios, the status quo, with the utility's resource commercialization schedule, and assuming sporadic participation by the utility.

## **Regulatory Economics**

- ***co-authored analysis of productivity trends in the gas LDC sector:*** Julia managed a team of LEI experts in the analysis of productivity trends in the US over the last fifteen years; LEI also studied the effect of indicators that drive relative efficiency differences across LDCs. LEI's analysis supported regulatory strategy and decision-making on rates.

- ***drafted a white paper reviewing New York PSC's recommendation to set a price cap on competitive retailers:*** Julia reviewed and refuted the evidence submitted by the regulatory staff in support of their recommendation to institute a price cap on the competitive electricity providers in New York's retail market on the basis of market power assertions.
- ***reviewed Eversource's internal analysis and conducted a fatal flaw analysis to provide comments and critiques:*** LEI also prepared an analysis describing qualitatively the challenges to various NTA solutions identified in Eversource's internal analysis. LEI also conducted an independent analysis to estimate the costs of any possible NTA solutions. This involved talking to engineering firms, other utilities (on a no-names basis) and gathering specific data on DG and micro grid generation installations. LEI also commented on the practical feasibility/challenges associated with siting specific NTA technologies in the project region.
- ***performed benefits analysis on proposed New York transmission line:*** LEI performed an analysis of benefits to NY consumers from a proposed transmission line between New York State and New England, analyzing the impacts from the proposed project's investments on GDP, jobs, tax revenues, and system reliability. LEI also performed a cursory review of the proposed project's environmental impact, based on criteria established by the NY DPS Staff in previous cases before the Public Service Commission
- ***conducted forecasting on gas-fired plant:*** LEI was retained by an infrastructure fund to do a 20-year energy and capacity price forecast in support of a potential acquisition of a planned gas-fired plant in Pennsylvania. The results will also be used to update the firm's valuation of its other plant in Ohio.
- ***analyzed Chicago congestion issues:*** London Economics International LLC ("LEI") was retained to do a resource analysis in the Chicago area and to analyze the congestion within the Chicago area and MISO zones surrounding Lake Michigan.
- ***reviewed energy and capacity prices in PJM:*** A private client was interested in acquiring a pumped storage hydro generation facility owned by LS Power in the PJM region. The client asked London Economics International LLC ("LEI") to prepare a proposal that will forecast the energy and capacity prices for the next 20 years of the relevant zone for this target asset. The price forecast exercise required LEI to model both energy and capacity markets on integrated basis, as well as using a Real Options Model to simulate the target unit's operational decision in arbitraging the peak versus off-peak hours in the energy market.
- ***analyzed the potential investment opportunities for a large IOU in energy storage in New England:*** Through intensive research and analysis, including simulation-based modeling, LEI identified potential opportunities for energy storage investment in New England and prepared estimate of societal benefits from such investment.
- ***conducted forecast on potential energy revenues of two proposed wind farms in Texas:*** In addition, LEI also analyzed the merchant energy, capacity, and solar renewable revenues for a solar plant in New Jersey.
- ***prepared overview of PJM market:*** LEI was hired to put together a presentation about the PJM market and investment opportunities in generation for the Public Utilities Commission of Ohio.

- ***evaluated impact of changes to Alberta's climate change and carbon emission regulations on the portfolio of the power sector as a whole, and electricity consumers:*** The analysis included modeling various scenarios using POOLMod relating to different specific regulations and assumptions to determine the financial impact on selected plants as well as the prevailing Pool Price forecasts for the province.
- ***reviewed procurement process:*** LEI was retained by Delaware Public Services Commission ("PSC") to assist with review of the procurement process for the provision of Delmarva Power & Light Company ("Delmarva Power")'s standard offer services, and to provide information and analysis regarding alternative long-term electricity procurement options for Delmarva Power to meet its Standard Offer Service residential and small commercial retail load. [Docket 14-0283]
- ***advised on market power screening analysis in contemplation of large-scale utility merger:*** LEI provided advise on analytical approach and potential mitigation strategies for horizontal market power concerns.
- ***authored report on IPP investment decisions:*** LEI was engaged by a private equity company to provide a briefing paper that compares the opportunities and tradeoffs of the "Buy" versus "Build" investment decision in the IPP sector. The paper contains quantitative and qualitative research and analysis, based on market data on purchase prices from recent transactions (focused on New York, New England, and PJM), versus the cost of new build assets.
- ***reviewed New England REC prices:*** LEI was retained by a renewable investor to review REC prices in the New England region and provide a forecast for various classes of REC prices for purpose of investment appraisal.
- ***provided assistance developing marketing materials for a transmission developer's roadshow:*** As part of this engagement, LEI developed a series of ready-to-share slide decks tailored to the specific target customers. Three categories of customers were considered: traders, utilities and wind developers.
- ***investigated the costs and benefits of proposed transmission line projects across New York State:*** The study included reviewing the proposed projects from each of the applicants to identify key characteristics of each project. LEI also undertook simulation-based modeling of the New York market to assess the potential magnitude of future congestion on the New York system under varying levels of projected gas prices. [Case 13-E-0488]
- ***conducted a simulation-based modeling exercise to determine the potential revenues for the proposed transmission project wheeling power from western MISO to eastern MISO (and eventually PJM):*** LEI evaluated both the revenue opportunities to the investors (e.g., private benefits of the line based on market price differences and the market value of the transmission) as well as social benefits to the MISO system (i.e., wholesale price reductions and capacity market price differences); and evaluated the incremental value of the business strategy of selling the energy (and capacity) out of East MISO to third parties who will serve customers ultimately in PJM. LEI's modeling exercise entailed evaluating intrinsic revenues (originating from power markets), extrinsic revenue (originating from price volatility), along with the green value of the Project (originating from the purchase of low-cost renewable energy).

- ***conducted due diligence on gas-fired assets in the US:*** LEI was engaged by a private equity firm to conduct due diligence on a 3,000 MW portfolio of gas-fired assets in PJM and ISO-NE. LEI was responsible for developing the model that was used in the pro forma financial statements.
- ***reviewed operation status of nuclear plants:*** LEI was retained to assess the impact of the continued operations of nuclear plants in the Midwest with state subsidies versus the closure of these nuclear plants in the electricity rates and the state's local economy.
- ***provided asset valuation due diligence and market analysis in support of the evaluation of geothermal resource opportunities in Germany as well as other investment initiatives in the region:*** LEI's scope included a comprehensive review of Germany's electricity sector, renewable energy policies, and integration within surrounding European power markets.
- ***authored white paper on MRAs:*** LEI was engaged by WIRES to prepare a White Paper on Market Resource Alternatives ("MRAs") which provides external parties with a clear understanding of MRAs and a concise description of how MRAs can work effectively alongside transmission investment in US power markets to support market development, reliability, and cost-effective supply.
- ***analyzed clean energy export opportunities:*** LEI was retained by Corporate Knights Inc. to perform a high-level estimation and analysis of potential opportunity for developing clean energy exports from Canadian markets to target US power markets. Julia Frayer presented a preview of her analysis at the ABB Energy and Automation Forum in September 2014.
- ***provided a market outlook for a portfolio of assets located in ERCOT:*** For a global investment firm, LEI provided a 10-year detailed market revenue forecast for the assets under base case assumptions. LEI also used its Real Options model to estimate a scarcity premium that would be included in addition to the intrinsic energy revenues.
- ***assisted a New England incumbent utility in evaluating the economic benefits of two solutions aiming to relieve energy congestion in the metropolitan area of Boston:*** LEI modeled various transmission solutions. The objective of the economic analysis from the energy market perspective was to examine whether there are any production cost savings or market price ("LMP") impacts from either proposal, and to describe under what conditions (assumptions) these benefits are realized.
- ***prepared a 10-year energy market price outlook for the New England wholesale power market and forecast the impact of a proposed project on New England market prices:*** LEI also determined the benefits of the proposed transmission project on employment, economic activity, and tax revenues in New England. LEI utilized the dynamic input-output ("I/O") economic model developed by Regional Economic Models, Inc. ("REMI") to measure the economic benefits to various New England states from the project on employment, economic activity, and tax revenues. LEI separated the economic impact caused by the construction of the project, and the impact caused by the reduction in energy prices due to the commercial operation of the project, taking into account issues such as usage of electricity in residential, commercial, and industrial sectors in the region, and also existing long-term energy contracts that would limit the impact of the project.

- ***analyzed revenue/gross margin modules for a district cooling asset being considered for acquisition in Ohio:*** Under this engagement, LEI performed a due diligence review of the information received from the seller (including documentation from the data room) and designed a series of models aiming at quantifying the asset's potential revenues. Part of LEI's scope work also consisted of identifying and assessing the opportunities to enhance and extend the customers base within the Cincinnati existing and future market conditions. LEI also evaluated the risks associated with prospective/existing customers forgoing the asset's services in exchange of self-supplying their cooling needs.
- ***provided expert analysis and insight on how the restructuring of the US electricity markets has affected the economics of nuclear power plants:*** For a Japanese research institute, LEI provided a Briefing Memo that responded to discrete questions related to the role of government, and the impact restructuring had on nuclear plant operations and financing.
- ***assessed proposed transmission project:*** LEI assessed the economics of the proposed Lake Erie HVDC transmission project to investors and potential customers, by projecting revenue streams associated with the sale of energy, capacity and other products via transit on the Lake Erie HVDC transmission project ("LEP"). The LEP is a 100-km long 1,000 MW bi-directional HVDC transmission line that will connect the Ontario energy market with the PJM market. LEI prepared a comprehensive report that includes a review of the Ontario and PJM markets, a 20-year (2017 to 2036) market outlook and prices for electricity, capacity and renewable energy credits in Ontario and the relevant zone/s in PJM; the total gross arbitrage value for the energy congestion rents, the capacity revenue potentials for PJM, and the renewable energy credits revenue potential in PJM.
- ***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.
- ***assessed proposed transmission project:*** LEI was retained to assist a private client in assessing the economics of this proposed transmission project and determining additional revenue streams or value adders from the perspective of third-party shippers. LEI was specifically asked to isolate and measure the spot market volatility premium.
- ***performed a due diligence and market study for three hydro units in PJM:*** LEI's tasks included reviewing the merchant prices and REC prices, evaluating the power purchase agreement and capacity charges and providing energy, capacity and REC forecasts.
- ***performed a review and analysis of rate making approaches applied to the client's capital expenditure profile including demonstration of the negative potential impact of "I-X" rate making approaches on a utility's ability to earn a fair return:*** The objective of this engagement will be to demonstrate to stakeholders and the Ontario Energy Board the reasonableness of the revenue cap per customer model that the client has previously relied

upon and planned to propose in its next ratemaking review. Furthermore, the secondary objective was to conceptualize the insufficiency of the “I-X” regime, even with a revenue cap per customer model, in consideration of the fair return standard and given the client’s business is operating in an environment where substantial capital expenditure needs are projected over the next Incentive Regulation Plan (“IRP”) period. Docket Number EB 2012-0459

- ***prepared 10-year (2014-2023) energy and capacity markets price outlooks for the New England market:*** This report presents results of a base case and low case long term price forecasts for the New England market using updated market information, as well as underlying assumptions, methodology, and a brief overview of the market along with a review of relevant regulatory considerations.
- ***testified in front of the New Mexico Finance Authority Oversight Committee regarding the potential economic benefits of new investment in transmission in the state of New Mexico:*** Julia considered the impacts of local spending during construction of the proposed HVDC project on the state economy, using BEA RIMS multipliers to estimate the boost to economic activity. Julia also employed the DOE’s JEDI model to estimate the potential for new jobs and GDP growth as a result of new renewables development in state (wind and solar) as a result of the transmission access that would be provided by the HVDC project.
- ***provided independent review of market benefit reports:*** LEI was engaged by NRG to provide an independent review of the economic analysis in two reports: “Report and recommendations comparing repowering of Dunkirk Power LLC and transmission system reinforcements”, published by National Grid (“NG”) on May 17, 2013, and “NRG Dunkirk Repowering Project Economic Impact Analysis”, published by Longwood Energy Group LLC (“LEG”) on March 20, 2013. Both reports forecasted market benefits, production cost savings and macroeconomic benefits. LEI’s review compared methodologies and assumptions used by each report, and how these may have affected their results; LEI’s review was subsequently submitted by NRG to Case 12-E-0577 at the New York Public Service Commission.
- ***conducted macroeconomic analysis of HVDC project:*** Julia was part of a team of economists that performed a macroeconomic analysis to estimate the local economic benefits accruing to taxpayers, residents, and businesses along the 800+mile route during construction of the Zephyr HVDC project, which runs from Wyoming to Colorado, Utah, and Nevada. LEI performed the analysis using the REMI P1+ model.
- ***conducted regulatory review in PJM:*** LEI was hired to review regulatory and market drivers of energy and capacity prices in PJM, and forecast prospective revenues of a portfolio of pumped storage and conventional hydro generation facilities offered by FirstEnergy, over a 20 year horizon.
- ***assessed market opportunities for industry-scale battery storage technology in the US and selected European jurisdictions for energy arbitrage and ancillary services provision:*** Under this assignment, LEI modeled the operation regime of a battery operating in energy and ancillary services markets in order to monetize added revenues for a wind and solar generators. Findings and modeling results were analyzed and presented before the client’s management team and were then deployed to develop strategy for marketing battery technology to renewable developers and utilities. Another objective of the project was to

identify most suitable markets and products to optimize the strategy of the battery's market entry.

- ***managed a market study reviewing historical electric rates (and projecting forward electric rates) for large commercial customers in the New England market:*** The electric rates analysis was composed of a number of components, such as the commodity costs of electricity, compliance costs for certain state programs (like RPS), delivery charge for delivering electricity, and ancillary services and administrative supply charges. LEI created projection for each of these components and considered state retail sales requirements for renewables, etc.
- ***advised on regulatory processes:*** LEI was engaged by Ontario Power Generation ("OPG") to support senior management through regulatory processes related to performance-based rates. Julia and her team of experts prepared a discussion paper on incentive regulation mechanisms ("IRM") currently in place in Ontario for electricity and natural gas distribution utilities and presented it at a technical workshop at the Ontario Energy Board ("OEB").
- ***triennial market power analysis:*** in support of various clients' application to renew market-based rate authorization under the provision of the Federal Energy Regulatory Commission ("FERC"), LEI performed Pivotal Suppliers Analysis and Market Share Analysis for the Northeast region, including New England, New York, PJM as well as the Connecticut, NYC and PJM East submarkets; as well as California and Southwest US markets.
- ***conducted a modeling analysis, in which the market price impact of incremental wind resources was projected:*** LEI staff completed a simulation-based forecast of the New England system for a future test year (2015) with varying levels of wind generation. Using the multi-scenario approach, we then estimated the energy market price reductions across a range of incremental wind generation scenarios. The simulation modeling was further supplemented with statistical analysis. The one-year analysis was also supplemented with sensitivities employing different baseline assumptions with respect to fuel prices.
- ***conducted market analysis on Maine transmission:*** LEI performed a fifteen (15) year simulation analysis to estimate the market impacts resulting from a new transmission interconnection (covering the timeframe 2015-2029) and project the impact on Maine customers (including Northern Maine customers). LEI evaluated the market evolution with and without the interconnection and described the potential ramifications for purchasing electricity for Northern Maine customers. The analysis also estimated the potential impact on ratepayers from the re-allocation of the ISO-NE Pool Transmission Facility rate to incorporate the Northern Maine load and franchise area under a pro forma 10-year transitional agreement. LEI performed the modeling using our up-to-date ISO-NE simulation model (which covers the energy and capacity markets), extended to represent in detail the Maritimes control area.
- ***prepared presentation material on the electricity market impacts and the benefits of Northern Pass Transmission project for New Hampshire and New England consumers:*** In addition, LEI staff assisted the client in preparation of an op-ed piece for dissemination to New Hampshire press outlets. LEI staff also attended an internal company meeting and testified on behalf of the client. Lastly, LEI staff assisted in the preparation for and attended the live New

Hampshire Public Radio program "The Exchange" to discuss the benefits of the Northern Pass Transmission over the hour-long live show.

- ***provided extensive late stage development due diligence for investor in four potential merchant transmission investments:*** LEI prepared three presentations analyzing four proposed merchant HVDC transmission projects across the US. Analysis included detailing the development roadmap for HVDC projects and the current status of the proposed projects, identifying potential competitive threats from other similar competing transmission lines and proposed local generation, and examining the renewable needs and willingness to pay of utilities in the "sink".
- ***authored report on capital expenditure recovery mechanisms:*** For a Canadian client, Julia prepared a report that looks into the different capital expenditure recovery mechanisms utilized in four markets namely Australia, New Zealand, Ontario, and the UK for electric network utilities. The report also provided different options that the client can propose for its performance-based ratemaking filing.
- ***evaluated third-party energy price forecast for the New England and Texas (ERCOT) regions, with a specific eye on the underlying assumptions:*** LEI recommended that certain key assumptions should be updated, including demand projections and CO2 price forecasts. We also argued that some underlying assumptions were unrealistic given actual market conditions, and should be adjusted or eliminated.
- ***assisted the Maine Public Utilities Commission in developing an electric resource adequacy plan to aid MPUC in the development of a strategy for the pursuit of the long-term contracts:*** The LEI team, led by Julia, submitted a report that builds up a set of recommendations for a long-term investment strategy based on an analysis of the current supply-demand situation, a review of the existing wholesale market rules for energy and the Forward Capacity Market, an examination of historical price trends, and review of the investment needs assessments prepared by the utilities and ISO-NE, as well as relevant sub-regional planning studies.
- ***led a due diligence team and assisting in the exclusivity negotiations with respect to an acquisition of a 400+ MW coal fired plant in the PJM market by a group of private investors:*** Julia's role included management of LEI's economic appraisal, coordination of preliminary technical due diligence, negotiations with third parties on possible off-take arrangements, and oversight over financial modeling.
- ***prepared a market study of the Ontario electricity market for a major potential investor in Ontario's generation assets:*** This report contained an overview of the Ontario electricity market, including a description of market evolution, a summary of key institutions, regulatory and policy initiatives that have impacted the market landscape, and a long term projection for the market going forward.
- ***authored report on California capacity markets:*** LEI prepared for the California Energy Commission a background report on the design evolution of a capacity market in California and its potential future impact on the generating assets in Mexico that import into the California ISO market.
- ***Analyzed Kentucky electricity industry:*** To satisfy the requirements of a recently passed statutory mandate, Julia and the LEI team conducted a broad-based analysis of current

practices and the potential for reform within Kentucky's electricity industry in four areas: (i) energy efficiency and demand side management; (ii) use of renewables; (iii) full cost accounting; and (iv) tariffs. Reported results to the state's regulatory commission, including a full set of recommendations in each of the four areas for overcoming existing impediments to legislative objectives for improvements in the industry's overall efficiency and reductions in its environmental impact.

- ***offered feedback on benchmarking methodology:*** Julia provided comments on the benchmarking methodology suggested by OEB consultants, looking at the analytical aspects of defining and benchmarking the performance of multiple utilities across long period of time. The critique provided details on how each criterion affects the benchmarking study and what are the remedies available to improve the results.
- ***conducted review on Ontario transmission:*** Julia led a team that reviewed industry best practices in other jurisdictions and the current situation in Ontario to advise OEB on the appropriateness of the uniform transmission rate, as well as on the feasibility of moving to long-run zonally-differentiated marginal cost pricing. As part of this process, LEI undertook a comprehensive stakeholder review.
- ***prepared MBR filings:*** Over the course of 2007 and 2008, LEI prepared over a dozen MBR filings for various markets coming under the FERC's triennial schedule as established in Order 697.
- ***electricity price forecasting:*** For an infrastructure fund, LEI used our proprietary production cost simulation model to forecast electricity prices and generation from each plant. In addition, LEI provided capacity price forecasts for California based on the Resource Adequacy Requirement (RAR) at the system and local level.
- ***conducted price forecasting analysis throughout North America:*** Julia headed the analysis of long-term price forecasts and energy market dynamics for many of the regions in the US and Canada, including New England, Pacific Northwest, California, Alberta, Southwest Power Pool, SERC, the Midwest US (ECAR, MAIN, and MAPP), Maritimes, Ontario, New England, and PJM. In this practice area, she manages a team of economists that use a variety of modeling tools to forecast one-year to fifteen-year wholesale energy, capacity (where relevant), and market-based ancillary services price forecasts. As part of the modeling effort, LEI proprietary dispatch simulation model, POOLMod, as well as other tools that have been developed by LEI, such as CUSTOMBid, ConjectureMod, ViTAL, and LEI's real options spark-spread module. This type of modeling effort required detailed investigation of the micro and macro-economic issues facing these regional markets: demand profiling, growth forecasting, reserve margin and new entry activity assessment. Such analyses are used by clients in establishing market values for assets they have targeted to acquire, consideration of portfolio risk and exposure, and assessments of procurement opportunities. This same modeling has supported regulatory analysis of utility acquisitions and planning strategies, consideration on the impact of market rules and as "reservation prices" for sale processes.
- ***reviewed power purchasing options at a large industrial customer's Southeastern facilities over three years:*** LEI assessed the probability of a supply interruption over the next three years due to the state of the transmission system in this region. We also assessed the facility's options for purchasing power for this load in the wholesale market.

## Development and Strategy

- *assisted in strategizing for the upcoming Clean Energy RFP:* For a leading New England law firm, LEI modeled a number of potential eligible projects that could offer into the RFP, and then performed a mock evaluation, with various cost-benefit ratios. Through this analysis, LEI identified key drivers and assumptions that could affect project ranking.

### **SPEAKING ENGAGEMENTS AND PUBLICATIONS:**

*“A holistic assessment of the challenges associated with powering the electric grid with 100% renewable energy”*, Internal Association for Energy Economics International Conference, Paris, France. June 21-24, 2020. [Invited]

*“Wind energy at the crossroads of an era: evolving utility business models, more aggressive decarbonization policies, and mounting consumer involvement in the electricity sector”* Keynote Speaker at the Canadian Wind Energy Association Annual Spring Forum, Montreal, Quebec. April 28, 2020. [Invited]

*“Renewables & Storage”* Panelist. NECA 2019 Power Markets Conference, Massachusetts. November 7, 2019.

*“Investing Trends in Canadian Energy”*, Energy Roundtable, Calgary, Alberta. October 10, 2019.

*“Reflections on US Market Developments”*, IPPSA Annual Conference 2019, Banff, Alberta. March 12, 2019.

*“Outlook for US Eastern Electricity Markets: ISO-NE, NYISO and PJM”*, Bank of America Merrill Lynch 2019 Gas, Power and Solar Leaders Conference, Boston, Massachusetts. March 5, 2019.

*“Alternate Regulatory Approaches”* CAMPUT 2018 Conference. May 10, 2018.

*“The Transformation of the Energy Sector” and “Role of Women in Energy”* SIPA’s Women in Energy Event at Columbia University. March 28, 2018.

*“Market pricing of oil: are there lessons for the electricity market?”* Gulf Coast Power Association 31<sup>st</sup> Annual Spring Conference - Session VIII -Valuing Dispatchable Resources, Houston, Texas. April 20, 2017.

*“Studying the impact of environmental policies on electricity market design.”* AIEE Energy Symposium: Current and Future Challenges to Energy Security, The University of Milan – Bicocca, Milan, Italy. December 1, 2016.

*“Energy storage – how will it be part of “Grid of Things” in the future?”* WIRES’ 2016 Spring Meeting. April 16, 2016.

*“Implications of Energy Infrastructure Investment on Local Economies in New England,”* REMI E3 Conference 2015: Energy, the Environment and the Economy, Amherst, Massachusetts, United States. July 30, 2015.

- “Renewables: No Longer a Noble Way to Lose Money?”* Moderator. SuperReturn US 2015 Conference, Boston, Massachusetts, United States. June 15, 2015
- “Perspectives on future trade opportunities between Canada and the US, and benefits to US consumers”* EUCI US/Canada Cross Border Power Summit Conference, Boston, Massachusetts, United States. April 8, 2015.
- “Are transmission expansions and upgrades compatible with both small- and large-scale clean energy?”* Panelist. Southwest Clean Energy Transmission Summit, Albuquerque, New Mexico, United States. April 1, 2015.
- “CEO Panel”* Moderator. ABB Energy & Automation Forum, Calgary, Alberta, Canada. September 10, 2014.
- “International Views and Addressing the Need for More Underground Transmission in the US”* Panelist. Platts 2014 Transmission Planning and Development Conference: Ensuring Grid Reliability, Planning Timelines, and a Robust Market’s Relationship with New Build, Arlington, Virginia, United States. June 18, 2014.
- Julia Frayer “System Operator’s Response to 1000 - How Can the Various Regions Work Together?”* Moderator. Platts 2013 Transmission Planning and Development Conference, Washington DC, United States. September 23, 2013.
- “Merchant Transmission: Planning and Development and Lessons Learned from North America,” Integrated* Transmission Planning and Delivery, Imperial College - Workshop for OFGEM, London, United Kingdom. January 11, 2013.
- “Demand for wind in New England: an economist’s perspective,”* AWEA Regional Wind Energy Summit, Portland, Maine, USA (with Shawn Carraher). September 5, 2012.
- “Cost effective procurement of Renewables to Meet Policy Requirements,”* NECPUC Symposium, Rockport, Maine, USA. May 22, 2012.
- “Best Practices for Transmission Asset Valuation,”* Transmission Grid Conference, London, United Kingdom (with Shawn Carraher and Yifei Zhang). March 16, 2012.
- “How effective is US technology policy on clean energy.”* 30th USAEE/IAEE North American Conference, Washington, DC, USA. October 10, 2011.
- “Are Markets Ready for New Energy Storage Technologies?”* 34th IAEE, Stockholm, Sweden. June 21, 2011.
- “Long Term Market Impact of Demand Response”* 33rd IAEE International Conference, Rio de Janeiro, Brazil (with Furhana Hasani and Yunpeng Zhang). June 7, 2010.
- “Applications of Information Policy Principles from Auction Theory in the Deregulated Electricity Market”* 32nd IAEE International Conference, San Francisco, California (with Zvika Neeman and Matthew Wittenstein). June 21-24, 2009.
- “Prepared Presentation of Julia Frayer for Market Monitoring and Surveillance in the context of Market Design.”* Panelist, PUCT Workshop for Project #28500, Austin, Texas. June 10, 2005.

- “Written Statement of Julia Frayer for the January 27th, 2005 Technical Conference in Docket RM04-7-000”* Panelist, FERC Technical Conference, Washington D.C. January 27, 2005.
- “Competitive procurement options for Ontario’s LDCs”* Speaker, APPrO 2004 Conference, Toronto, Ontario (Canada). November 24, 2004.
- “Beyond market shares and cost-plus pricing: designing a horizontal market power mitigation framework for today’s electricity markets.”* *Electricity Journal* (with Nazli Uludere, and Sam Lovick). November 2004.
- “Alternative to LMP pricing for transmission: a case study of the ICRP approach used by National Grid Company in the UK.”* Speaker, Electric Power Conference 2004, Baltimore, Maryland. March 31, 2004.
- “The World Changed on August 14th: the (Second) Great Northeast blackout.”* Chairman of Panel Session, Electric Power Conference 2004, Baltimore, Maryland. March 30, 2004.
- “Big ticket leasing - what next for the future?”* Panelist, Big Ticket Leasing 2003, London (United Kingdom). March 12, 2003.
- “Evaluating the Electron Highway”* Speaker, IPPSO 2001 Conference, Richmond Hill, Ontario (Canada). November 2001.
- “What is it worth? Application of real options theory to the valuation of generation assets”* *Electricity Journal* (with Nazli Uludere). November 2001.
- “X Marks the Spot: How UK Utilities Have Fared Under Performance-Based Ratemaking”* *Public Utilities Fortnightly* (with AJ Goulding and Jeffrey Waller). July 15, 2001.
- “How much is it worth? Applying real options valuation framework to generation assets”* Speaker, Electric Power 2001, Baltimore, Maryland. March 22, 2001.
- “Dancing with Goliath: Prospects After the Breakup of Ontario Hydro”* *Public Utilities Fortnightly* (with AJ Goulding and Nazli Z. Uludere). March 1, 2001.



**From:** 2010  
**Employer:** Deloitte & Touche (Deloitte Consulting & Monitor Deloitte)  
Senior Associate, Strategy

**From:** 2008  
**Employer:** Frost & Sullivan  
Consultant, Strategy

**From:** 2005  
**Employer:** Standard & Poor's  
Senior Associate, Fixed Income and M&A

## **RECENT PROJECT EXPERIENCE:**

The projects briefly described below are typical of the work Himanshu Bhardwaj has performed.

### **Energy related studies**

- *Drafted 8 MOUs resulting in over US\$250MN in investment through an improved market access and investor relations strategy, economic impact assessment, and privatization for a major downstream (oil & gas) industrial city.* Himanshu led the investor participation strategy for a leading national oil company's downstream activity in an industrial city in Middle East.
- *Advised a leading public sector utilities company on tariff mechanism review for commercial and residential sector.* The study involved various scenario assessments across demand - supply gaps in peak loads and non-peak loads seasons. Further, digitization of meters and billing processes was included as a part of the strategy implementation.
- *Yielded a multimillion-dollar cost optimization strategy for a major oil company by drafting a 10-year business plan.* Himanshu co-managed the study during the 2014-2015 oil crisis, by optimizing multiple variable cost drivers (such as opex, margins, taxes, and forex), translating into a 1.25% overall cost savings.
- *Supported a leading oil and gas exploration company in increasing revenues 10x by drafting a successful growth strategy.* Identified offshore exploration projects in Asia Pacific alongside supply chain and logistics requirements and introduction with various refineries and downstream players along the value chain.

### **Various public sector & infrastructure studies**

- *Identified revenue growth opportunities of appx. 500% for a leading civil aviation authority by reorganizing through a privatization strategy after decades of sustainable losses.*
- *Orchestrated and presented a multi-billion private sector participation plan to a government healthcare authority, covering national healthcare infrastructure and healthcare insurance, impacting over 30 million citizens.*
- *Implemented a digital strategy for a leading telecommunication and infocom authority with an estimated economic impact of US\$100MN through a 'data monetization' opportunity covering ownership, privacy, and open data.*
- *Devised and launched a local content strategy and economic impact assessment for a major commerce and trade authority through opportunities worth US\$2BN by calculated expansions of their infrastructure, energy, and transportation sectors.*
- *Developed a multibillion-dollar portfolio strategy for a leading sovereign wealth fund covering a comprehensive social portfolio, including education, hospitals, social infrastructure, and low-to-mid-income housing assets.*
- *Remodeled the business plan of a tourism authority through private sector investment in tourism assets (national parks, attractions), positively impacting over 2 million citizens in the province and generating over US\$50MN in fiscal revenues.*
- *Overhauled the non-core postal delivery operations of a national postal agency through a US\$100MN privatization strategy that included establishing fulfillment center and banking operations, and transforming last mile delivery.*
- *Earned US\$500K in success fees on a PPP deal by delivering a privatization strategy for a Shanghai port authority.*
- *Achieved a 5% reduction in costs through reorganization and transformation of the healthcare regulator in Singapore.*
- *Partnered with a leading telecom regulator on a 3G rollout strategy and auction plan impacting over 200 million citizens.*