

March 11, 2022

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Re: RFP 22-12, Entergy Services LLC, *Potential Requests for Proposals for Renewable Resources*

Dear Ms. O'Brian:

Please find attached London Economics International LLC ("LEI")'s proposal to act as an outside independent technical consultant and assist the Louisiana Public Service Commission ("LPSC") in the matter of Entergy Services LLC's *Potential Requests for Proposals for Renewable Resources*.

LEI is uniquely qualified for this role with extensive knowledge of resource procurement processes and specifically of requests for proposals ("RFPs") for renewable resources. LEI has performed a broad range of technical consulting services related to oversight of procurement processes.

There are no actual or potential conflicts of interest for LEI in performing the contractual obligations contemplated in this RFP. LEI is currently working for the Louisiana Public Service Commission in the matter of Docket No. R-35423 (Rulemaking to study Renewable Energy Tariff Options), the matter of Docket No. X-35522 (Audit of Fuel Adjustment Clause Filings for Cleco Power LLC), the matter of Docket No. X-35523 (Audit of Fuel Adjustment Clause Filings for Entergy Louisiana LLC), and the IRP processes for Entergy Louisiana LLC (Docket No. I-36181), Cleco Power (Docket No. I-36175), and Southwestern Electric Power Company ("SWEPCO") (Docket No. 36242). LEI is not currently working for a utility and/or investor 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  
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# Proposal responding to RFP 22-12 to assist the Louisiana Public Service Commission with the Entergy RFP for renewable power

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



March 11, 2022

*London Economics International LLC (“LEI”) is pleased to submit this proposal to the Louisiana Public Service Commission (“LPSC” or “the Commission”) to serve as the outside independent technical consultant in the process related to Entergy Services LLC’s potential requests for proposals (“RFP”) to procure renewable resources on behalf of Entergy Louisiana LLC.*

*LEI is a leading energy consulting firm that has advised regulators and utilities on tariffs and ratemaking, as well as procurement. LEI has performed the role of Independent Evaluator for renewable RFPs in the past. The firm possesses over 20 years of experience advising regulators, electric and natural gas utilities, private firms, and specific customer classes across the United States and Canada as well as among international jurisdictions. LEI has worked with a variety of regulators including the LPSC and has experience testifying on behalf of public agencies on ratemaking matters.*

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## 1 Executive summary

London Economics International LLC ("LEI") is pleased to submit this proposal to the Louisiana Public Service Commission ("LPSC" or "the Commission") to serve as technical consultant in the matter of a potential RFP for renewable resources to be issued by Entergy Services LLC ("ESL") on behalf of Entergy Louisiana LLC ("ELL"). LEI is well qualified to take on this engagement for the following reasons:

- LEI's over **two decades of experience with competitive solicitations** underpins its ability to apply its technical and economic views and experience in what makes a good solicitation; LEI has served as the fairness advisor/independent evaluator for solicitations in California, Ontario, and the Pacific Northwest, has performed regulatory audits for integrated utilities which have included review of procurement practices. This practical experience coupled with LEI's strong theoretical economics background enables it to provide timely and meaningful advice on solicitation processes and their implementation.
- LEI has developed **standardized solicitation documents and contracts** for initiatives as diverse as Alberta market institutions and Saudi regulators. LEI has also **administered competitive solicitation program processes** in which forms it developed were used; examples include procurements in the state of Connecticut, to cite but one example.
- The firm has detailed knowledge of the **cost structure and performance of solar and battery storage** gleaned from hundreds of prior related engagements. This includes working with developers on feasibility studies, assisting in preparation for bids in similar procurements, and helping to value existing solar and storage facilities. LEI has created **proprietary models** which are specifically targeted to assessing storage revenues within the value stack of a particular jurisdiction.
- LEI has significant **knowledge of designing competitive solicitation incentive structures**, having designed such structures internationally, advised clients in a number of Canadian provinces on appropriate procurement designs, and worked with market participants across North America in preparing bids into procurements or developing projects within declining price tranche arrangements.
- LEI **has a track record of service to the Louisiana Public Service Commission**, and familiarity with key Orders which apply to utility solicitation of resources.

## 2 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 a 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 regulators and government institutions (see Figure 1).

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, GHGs 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.*

## **2.1 Background and staffing**

LEI is extremely well-qualified to serve as a technical consultant to the LPSC. As described in detail in Section 3, LEI has experience in monitoring and evaluating utility RFP processes. LEI understands the regional power market in the Midcontinent Independent System Operator (“MISO”) region, producing semi-annual market outlooks based on LEI’s detailed production simulation model of MISO. LEI understands the perspective and objectives of state regulators, having worked with many regulators. The firm has experience testifying on a variety of issues related to rate design, competitive markets, and long-term planning.

Based on the requirements of the engagement, LEI has gathered a select team of professionals with the required qualifications to assist the LPSC. The team possesses considerable independent assessment expertise, analytical and technical capabilities, and strong understanding of power markets, including MISO.

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

- *Marie Fagan, Chief Economist*
- *Barbara Porto, Consultant*

*Marie Fagan* will have overall responsibility for the project and will act as project manager and testifying expert. *Barbara Porto* will serve as a core team member. In addition, LEI staff in Boston and Toronto will provide additional support as needed.

## **2.2 Brief bios of key staff assigned to the project**

**Marie Fagan**, Chief Economist at LEI, will serve as the **project manager** for this engagement, and **expert witness**. With over 30 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. For state agencies, she has served as an expert witness and managed lengthy, high-profile projects. She has led LEI projects for the LPSC.

**Barbara Porto** is a Consultant at LEI where she supports the firm’s engagements with regulators, utilities, and private firms on issues regarding ratemaking, market design, project evaluation, and wholesale price analysis. She is experienced in performing utility management audits and has been a key team member on engagements related to evaluation of utility RFPs.

Full CVs of the key team members are available in Section 7 (Appendix A).

### **3 Qualifications and experience**

This section outlines LEI's understanding of the engagement and selected relevant experience.

#### **3.1 Understanding of the engagement**

LEI understands that ESL may potentially issue an RFP for renewable resources to be acquired on behalf of ELL. The services of an outside independent technical consultant are sought to provide the Staff of the Commission with advice and counsel during the course of ten (10) months noted in the RFP. LEI is aware that the time frame may ultimately be longer, and in that case, LEI will commit to serving as the independent technical consultant for the entire time frame of the engagement.

The scope of representation to which LEI commits includes, but may not be limited to:

1. reviewing certification applications, testimony, and exhibits;
2. drafting and assistance in drafting, reviewing, and responding to discovery;
3. analyzing responses to discovery requests;
4. participating in formal status conferences, pre-trial conferences, depositions, and hearings;
5. drafting and preparing pre-filed testimony (including exhibits) in support of Staff's ultimate recommendations;
6. reviewing and responding to rebuttal testimony;
7. assisting in preparation of direct and cross-answering testimony;
8. assisting in trial preparations (including cross-examination of witnesses and drafting; pleadings, motions, and exceptions);
9. reviewing and analyzing stipulation terms;
10. assisting in drafting briefing sheets and Orders as needed;
11. participating in formal and informal conference calls, meetings, and conferences with the Commission and Staff, and attend Business and Executive ("B&E") Sessions as needed.

##### **3.1.1 Familiarity with LPSC General Orders and minimum RFP requirements**

LEI has working knowledge of LPSC's general orders and is familiar with all the minimum requirements listed in the RFP:

*1) The Commission's Market Based Mechanisms Order and its 1983 General Order.*

The Commission's Market Based Mechanism Order (approved in 2002, subsequently amended a number of times), requires jurisdictional utilities to employ market-based mechanisms to support the acquisition (or purchase power agreements) of generation assets to serve Louisiana retail load. The results and analysis used to implement such mechanisms form the part of the justification as required under the 1983 General Order.

The Commission's General Order dated September 30, 1983 ("1983 Order"), as amended by the Commission's Order No. R-30517, dated October 29, 2008, establishes the procedures and

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requirements to issue the certificate of public convenience and necessity for construction of generating assets by jurisdictional utilities or other long-term resource procurements.

*2) Principles associated with resource acquisition, including but not limited to whether or not a particular resource meets the utility's need for power and whether the considered resources are able to meet those needs.*

The primary principles of acquiring resources are laid in the 1983 General Order: justification required for the certificate of public convenience and necessity, which has to be satisfied with the analysis utilized for market-based mechanism (2002 Market Based Mechanism Order).

*3) Whether or not resource will provide reliable services at the lowest reasonable cost.*

The Commission's IRP Rules - General Order dated April 20, 2012 (Corrected) (Docket No. R-30021) specify the following conditions:

- Section 6 Part A: the first step in the IRP analysis focuses on reliability – develop system reliability assessment using one day in 10 years Loss of Load Probability criterion;
- Section 6 Part F: optimization analysis: select resources that minimize the costs, while meeting the operating constraints, including reliability.

*4) Resource planning methods to improve the efficiency and reliability of a utility's power supply operations and whether the utility is making use of any such methods.*

There are two aspects to improving the efficiency and reliability of the power supply operations: (i) improve and/or maintain the efficiency and reliability of the existing fleet, and (ii) add new generating that is more efficient and more reliable, either to meet the growing demand and/or replace the less efficient and less reliable capacity.

The operations of the existing fleet are monitored and reported as performance, reliability and efficiency parameters. The most commonly used report is the data provided to Generation Availability Data System of the North American Electric Reliability Corporation (NERC's GADS). These data provide a valuable tool in benchmarking the operational performance, and help identify the areas of deficiency that require management's attention.

*5) Public interest criteria for approval and monitoring of electric generating facility projects.*

The major public interest criteria when approving and monitoring of electric generating facility projects focus on:

- Whether impact on ratepayers is prudent and fair;
- How the proposed facility contributes to meeting the current and future demand needs;
- Whether the proponent is fit in terms of operational competence and financial capacity;
- Evaluation of the impact on other market participants – whether there is any adverse impact on the competitiveness;
- How it impacts the reliability and safety of the electric system.



6) *LPSC rules on affiliate transactions.*

In the context of LEI's audits of the Fuel Adjustment Clause ("FAC") of several Louisiana utilities, LEI has examined whether affiliate transactions were present.

7) *Appropriate accountings standards.*

LEI's experience as a management auditor for LPSC and other public service commissions in the United States provides a solid understanding of cost categories and allowable costs for electric utility cost recovery.

8) *MISO tariffs, rules and planning processes.*

LEI has a deep understanding of the MISO market. LEI monitors the market for ongoing client work and produces a semi-annual regional market update and wholesale price forecast for MISO and ten other North American power markets.

## **3.2 Selected experience**

LEI has its roots in advising on the initial round of privatization of electricity, gas, and water companies in the United Kingdom. Since then, the firm has supported private sector clients, market institutions, and governments on privatization, asset valuation, deregulation, tariff design, market power, and strategy worldwide. This section provides a selection of projects relevant to the proposed engagement. The projects listed here are indicative of LEI's expertise and are not an exhaustive record of experience.

### **3.2.1 Development, administration, and evaluation of resource procurements**

LEI's experience in developing, monitoring, and evaluating resource procurements provides LEI with hands-on familiarity with best practices for RFPs.

- ***PacifiCorp 2017 Solar RFP:*** LEI was retained as an independent evaluator ("IE") by PacifiCorp for its system-wide 2017 Solar RFP. In this engagement, LEI's work included a review of and recommendations for PacifiCorp's Solar RFP solicitation, the facilitation and monitoring of communications between PacifiCorp and over 40 bidders, performing a review of the initial shortlist evaluation and scoring of over 100 bids, and the preparation and filing of two status reports and one final IE closing report.
- ***Review of procurement processes:*** LEI was retained by Delaware Public Services Commission Staff to perform an analysis of the procurement process for the provision of Delmarva Power & Light Company ("Delmarva Power")'s Standard Offer Service, 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.
- ***Southeast transmission solicitation:*** LEI developed and managed the Open Solicitation for a 2,000 MW transmission line from Texas to Georgia, including helping to develop the documentation, the bid evaluation process, the bidder's conference and assessing the bids.

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LEI also drafted a report attesting to the competitiveness of the Open Solicitation process and that all bidders were given access to the same information and evaluated using the same criteria.

- ***New Mexico open season:*** LEI was retained by a transmission developer to serve as Independent Examiner for a proposed merchant transmission project open season process. The project entailed overseeing the entire process, including drafting announcements and press releases, preparing the Open Season documents and forms, conducting information sessions, creating the associated website, evaluating and ranking bids, and submitting a report to FERC as part of the developers' Section 205 filing.
- ***PG&E independent evaluator:*** LEI 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"). 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").
- ***PG&E independent evaluator consortium:*** LEI is part of a pool of consultants to the Pacific Gas and Electric Company's Independent Evaluator to monitor long-term resource solicitations that may involve affiliate, utility-owned or utility-turnkey bids and for all competitive solicitations seeking products greater than two years in length. If chosen, LEI as an Independent Evaluator will monitor the following: (i) the Renewable Portfolio Standard (RPS) solicitations and bilateral contracts, including solicitations related to PG&E's Photovoltaic (PV) Program; (ii) competitive solicitations that seek energy products of two years or greater in duration, certain bilateral transactions, and contract amendments; and (iii) Competitive solicitations for power procurement involving affiliate transactions and IOU-built or IOU-turnkey bidder.
- ***Independent evaluator for Connecticut DPUC:*** LEI was hired by the State of Connecticut's Department of Public Utility Control (DPUC) to oversee the Transitional Standard Offer (TSO) auction by Connecticut Light and Power (CL&P) for its 2005 and 2006 load (more than 5,000 MW peak demand). 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.
- ***Ontario renewable energy solicitation:*** LEI was retained by the Ontario Power Authority to independently evaluate applications for the Aboriginal Renewable Energy Fund. LEI provided due diligence reports for each application, and developed a financial model to assess a range of possible equity returns for projects.
- ***New York transmission solicitation:*** LEI was retained by a transmission developer to serve 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.

- ***Midwest transmission solicitation:*** LEI was selected by a transmission developer to serve as Independent Examiner for a proposed merchant transmission project open solicitation process in the Midwest US connecting two large RTOs. LEI designed a novel process to not only solicit transmission customers, but match suppliers, buyers, and marketers so to help reduce the market risk of shippers signing up for long term transmission agreements. LEI's scope of work included designing the solicitation process, meeting with FERC staff in advance of the project's application for negotiated rate authority, preparing all solicitation documents, coordinating the marketing campaign with an outside firm, conducting information sessions, matching suppliers/buyers/marketers, allocating transmission capacity, and submitting a report to FERC demonstrating the results of the process as part of the developers' Section 205 filing.
- ***Fairness monitor for evaluation of feed-in tariff applications:*** The LEI team aided in the design of the evaluation framework of renewables feed-in tariff ("FIT") applications and provided on-going support during the evaluation process. LEI staff performed a mock evaluation in parallel with the client (the Ontario Power Authority ("OPA")) as a method of auditing the results. The LEI team also prepared a final report that outlined LEI's opinion as to the fairness of the overall process.

### 3.2.2 Experience with solar energy projects

LEI expects that ESL would receive bids primarily from solar developers. LEI has performed many consulting projects related to solar power.

- ***Solar portfolio valuation:*** LEI was engaged by two clients to support a solar portfolio valuation by providing the residual valuation of the portfolio at the expiry of existing PPAs. LEI's team considered the long-run average costs of price-setting technology over the relevant timeframe consistently with the hourly generation schedule anticipated for the asset at that time.
- ***Evaluation of distributed solar PPAs:*** On behalf of a private equity fund, LEI conducted due diligence review and analysis in support of an acquisition of a portfolio of renewable generation assets in the United States and South America. The engagement focused on reviewing a portfolio of distributed solar power purchase agreements, including analyzing sources of revenue, examining exposure to different markets, and identify risks associated with each business model.
- ***Levelized cost over economic life of various technologies:*** LEI was engaged by Massachusetts utilities to determine the economic viability of non-transmission alternatives ("NTAs") to replace a combination of transmission solutions designed to address reliability and performance issues in the Greater Boston area. LEI's scope of work consisted of determining the least cost combination of technologies that could be integrated to the New England transmission system and provide the same reliability benefits as the proposed transmission lines. A combination of supply-side and demand-

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side resources were considered for the study, this included: distributed solar PV, utility-scale solar PV, energy efficiency and active demand response, conventional generation (gas CCGT and peakers), as well as energy storage devices.

- ***Solar net metering in NH and NY:*** For a private equity power sector investor, LEI conducted a report on net metering programs in New Hampshire and New York to determine if the client's facilities would qualify. Project work included determining load at the sites, examination of net metering in the applicable regions, assessment of potential solar installation, exploration of installation options to determine which would be most suitable, and analyzing potential returns.
- ***Solar value driver:*** LEI was engaged to provide a high-level value driver and risk framework for US solar projects in selected locations. The analysis included case studies of existing solar PV projects, and economic quantification of select projects.
- ***Assessment of solar portfolio:*** LEI was engaged by a leading renewable power generator for professional services related to assistance with developing underwriting scenarios for a solar portfolio located across several US states. LEI reviewed the Seller's model assessing reasonability of re-contracting assumptions for the portfolio across all markets, provided high level commentary around outlook for renewables in key markets, highlighted any other red flags or key concerns that were captured as part of the review, and identified any potential options for performance improvement projects based on the key markets (e.g. repowering, addition of storage, selling to different markets etc.).
- ***Investor support:*** Worked as part of a multi-firm engagement on a comprehensive analysis of the regulatory and business environment for renewable technologies in the United States for diversified European investor looking for global investment opportunities. The analysis included review of federal and state tax benefits for renewable projects, assessment of mid-term prospects of electricity sector and revenue potential for wind, solar and other renewable power plants.
- ***Solar business models:*** For a client in Quebec performing diligence on a potential investment in business-to-business behind-the-meter solar in the Northeast United States, LEI examined US federal and state incentives, and provided an overview of the different business models used for targeting commercial, institutional, and industrial sectors. LEI provided a discussion of the competitive landscape under each of these business models; and a 10-year outlook for solar renewable energy credits ("SRECs") where applicable.
- ***Levelized cost of energy ("LCOE") for new solar and storage:*** LEI was retained by an independent power producer to project the 2029 LCOE for a solar + storage facility.
- ***Cost of utility-scale solar:*** For a large utility, LEI performed a detailed bottom-up analysis of the range of costs for building a utility-scale solar farm in a Canadian province. LEI researched potential costs for multiple solar module technologies, interconnection options, and land types. The cost analysis customized the hardware, labor, and other costs into the province's business landscape to develop an accurate representation of the costs for building a solar generation resource.

- ***Impact of solar:*** For a large utility, LEI prepared an outlook for the expected impact of solar resources (both behind-the-meter (“BTM”) and utility-scale) in New York and New England. LEI presented a forecast of annual locational installed capacity for both types of resources in ISO-NE and NYISO, estimated the impact of BTM solar on aggregated net annual demand, illustrated the representative impact on the hourly load profile for typical summer and winter days, and projected the impact of solar resources on supply and demand curves in the energy markets.

### **3.2.3 MISO region experience**

LEI closely monitors the MISO market for ongoing client work. LEI also produces a 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 serves as a solid foundation for this engagement.

- ***Rulemaking to study renewable energy tariff, aka “green tariff” options:*** LEI supported the LPSC in Docket No. R-35423. LEI provided framing questions for stakeholder feedback on green tariff options, evaluated stakeholder responses, provided in-depth case studies of green tariffs in other US jurisdictions, and provided other consultatory services for the Commission.
- ***Audit of fuel adjustment clause for Entergy Louisiana:*** LEI was engaged by LPSC, Docket No. X-35523, to perform an audit of the Fuel Adjustment Clause filings of Entergy Louisiana. The audit involved detailed examination of monthly true-ups of incurred costs with billed costs; the appropriateness of interest rates as applied to over-recovered or under-recovered costs; examination of the impact of deferred costs; reconciliation of expenses recorded in FERC Form 1 account categories (“as booked”) with expenses included in monthly fuel adjustment clause filings; the prudence and reasonableness of costs incurred for oil, gas, coal, and nuclear fuel and transportation, and an assessment operating performance of utility generating assets
- ***Audit of fuel adjustment clause for Cleco Power:*** LEI was engaged by LPSC, Docket No. X-35522, to perform an audit of the Fuel Adjustment Clause filings of Cleco Power. The audit involved detailed examination of monthly true-ups of incurred costs with billed costs; the appropriateness of interest rates as applied to over-recovered or under-recovered costs; examination of the impact of deferred costs; reconciliation of expenses recorded in FERC Form 1 account categories (“as booked”) with expenses included in monthly fuel adjustment clause filings; the prudence and reasonableness of costs incurred for oil, gas, coal, and lignite; and transportation; and an assessment operating performance of utility generating assets
- ***Management audit of a major utility in MISO:*** LEI was engaged by the Mississippi Public Service Commission (“MPSC”) to perform a two-year audit of the management activities of a major vertically integrated utility. LEI assessed the utility’s practices for economic procurement of fuel and electric energy, evaluated fuel and energy contract terms, investigated the operations of the utility’s coal, gas, and nuclear generation units, and reviewed the prudence of coal inventory levels and inventory control procedures. LEI also audited the prudence of MISO operations and overall plant operations. Following

the two-year audit, the MPSC engaged LEI for another two years to audit the other major vertically integrated utility in the state.

- ***Due diligence for a potential asset acquisition in MISO:*** LEI was engaged to assist in due diligence for a gas-fired generation asset. LEI reviewed contracts and performed financial analysis, with a specific focus on the assumed market value of capacity in the long term, and locational marginal prices for energy. 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 the gas and electricity market in the region.
- ***Revenue opportunity for gas-fired cogeneration units in MISO:*** LEI was engaged to inform the client of potential risks upon the termination of power purchase agreements (“PPAs”). LEI simulated MISO’s energy and capacity markets and derived forecasts 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 eastern MISO to third parties in PJM.
- ***Costs/benefit analysis of Entergy joining an RTO:*** LEI was hired by the Public Utility Commission of Texas (“PUCT”) to provide a cost/benefit analysis of the decision by Entergy to join MISO. LEI provided quantitative and qualitative analyses of specific costs/benefits attributable to Entergy Texas, Inc. (“ETI”) and its customers following membership in MISO compared with membership in the Southwestern Power Pool (“SPP”).
- ***Review of ETI’s impact analysis related to termination of a PPA:*** 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.
- ***Estimating coal plants’ energy and capacity revenues in MISO:*** For a large foreign utility, LEI performed the valuation of two power plants to determine their potential value upon expiration of an ongoing PPA. The plants’ revenues were calculated based on LEI’s 25-year forecasts of electricity prices in their respective zones. Given the long-term horizon of the modeling exercise, LEI also simulated an organized capacity market based on the resource adequacy requirements of MISO to estimate potential capacity revenues for the plants.

### **3.2.4 Expert witness experience**

LEI has performed dozens of engagements involving serving as an expert witness. The work listed below is a small sample.

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- ***Independent expert assessing role of Enbridge Line 3 for Minnesota:*** LEI was engaged as the 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. LEI provided written testimony, responded to interrogatory requests, and provided written surrebuttal and oral testimony. [Docket No. PL-9/CN-14-916, OAH Docket No. 65-2500-32764]
- ***Independent expert related to Maine Energy Cost Reduction Act:*** LEI was engaged by the State of Maine Public Utilities Commission (“MPUC”) to assist in evaluating options for expansion of natural gas supply into Maine. LEI authored pre-filing reports, 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 served as an expert witness in the proceedings. [MPUC Docket No. 2014-071] URL: <https://mpuc-cms.maine.gov/COM.Public.WebUI/Common/CaseMaster.aspx?CaseNumber=2014-00071>
- ***Testimony related to Audit of power purchase agreement (“PPA”) Rider of AEP Ohio:*** LEI was engaged by the Public Utility Commission of Ohio (“PUCO”), to perform an audit of the PPA Rider of AEP Ohio related to AEP’s purchase of energy from the Ohio Valley Electric Corporation (“OVEC”). Aspects of the audit included assessing the reasonableness and prudence of the disposition of energy and capacity in the PJM market of the energy provide by two coal plants, as well as plant performance, compliance with environmental requirements, and the prudence of fuel purchases. LEI also audited charges and true ups related to the company’s quarterly PPA filings. LEI provided written and oral testimony on the matter [PUCO Case No. 18-1004 EL-RDR].
- ***Testimony related to transmission operating rules and curtailment protocols for interties into Alberta:*** Rules were promoted by Alberta Electricity System Operator (“AESO”) in order to support a fair, efficient and openly competitive power market. The LEI 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. LEI’s analysis considered commercial as well as operating protocols in deregulated power markets and how market rules incentivize new entry and produce dynamic efficiency gains. AUC Docket Number 1607958. URL: [http://www.auc.ab.ca/regulatory\\_documents/Pages/default.aspx](http://www.auc.ab.ca/regulatory_documents/Pages/default.aspx)
- ***ISO-New England tariff design:*** LEI submitted testimony on behalf of ISO-New England (“ISO-NE”) to the FERC to help defend the ISO’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 intensive financial modeling 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 jurisdiction of FERC, LEI performed Pivotal Suppliers Analysis and Market Share Analysis for the Entergy balancing authority area. (2011) [ER97-4281 et al.]

## 4 Proposed plan of action

In the course of this engagement, LEI senior team members will confer with the LPSC Staff in the form of periodic calls and by e-mail and will be available to attend meetings in Baton Rouge as needed. LEI senior staff will be available to attend or lead technical conferences, if any, and conduct informal meetings with parties as needed.

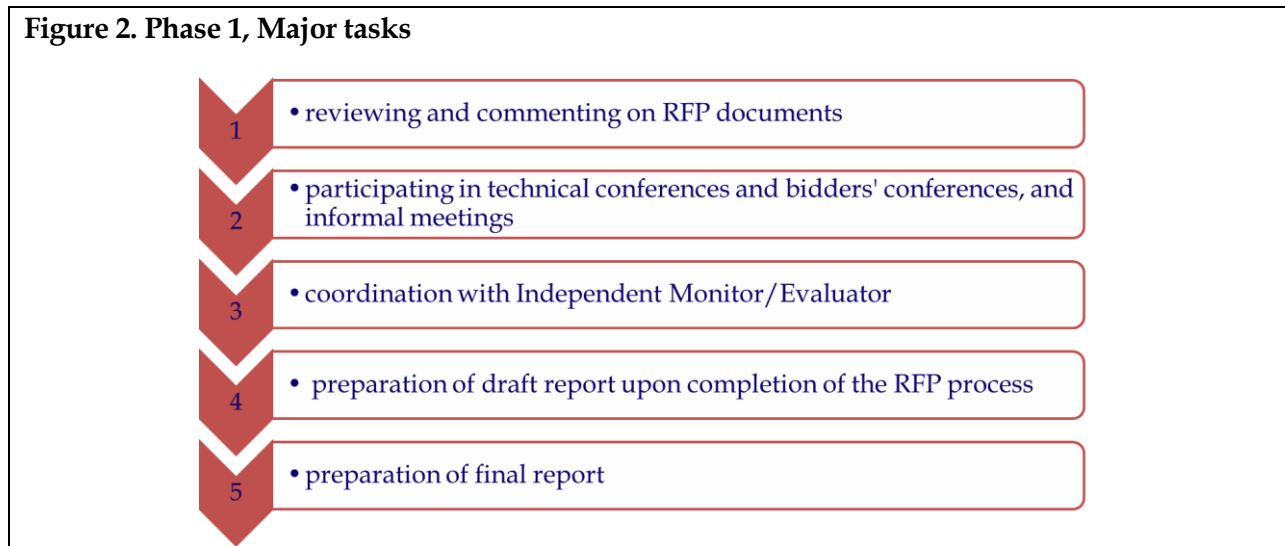
LEI has developed a two-phase plan of action, described below.

### 4.1 Phase 1: RFP process

LEI's experience as an independent evaluator of renewable RFPs is invaluable in our role in Phase 1. Solar RFPs tend to attract a large number of bidders, so it is essential that the RFP documents are clear, and the minimum requirements for bidders are fair (to encourage a large number of bids) but are demanding enough (so that only truly qualified entities will be able to submit bids). LEI sees Phase 1 as consisting of five (5) tasks (see Figure 2).

Please note that LEI does not envision reviewing individual bids, because that is typically the role of the independent monitor (aka independent evaluator ("IE")).

**Figure 2. Phase 1, Major tasks**



#### 4.1.1 Task 1.1: Review and comment on RFP documents

LEI has in the past provided comments on RFP documents, which include but are not limited to assessments of i) clarity to potential bidders, ii) attractiveness (the more bidders, the more competitive the RFP, which is better for customers), iii) minimum requirements for bidders, iv) the role of a benchmark utility-build bid, v) the criteria and weighting used by ESL to select bids.



**Deliverable associated with Task 1.1**

The deliverable for Task 1.1 will be a memo to Staff containing LEI's assessment of ESL's RFP documents.

**4.1.2 Task 1.2: Participate in technical conferences and bidders' conferences, and informal meetings**

LEI has in the past participated in both bidders' conferences and has monitored interactions between the issuer of the RFP and individual bidders. LEI has performed this role for a solar RFP which attracted over 40 bidders and over 100 individual bids.

**Deliverable associated with Task 1.2**

The deliverable for Task 1.2 will be attendance at meetings and conferences, followed by a brief summary memo to Staff.

**4.1.3 Task 1.3: Coordinate with Independent Monitor/Evaluator**

LEI project manager Marie Fagan has served as an independent evaluator ("IE") for renewable RFPs, so she is familiar with the role of the IE. This experience will support productive and efficient interaction with the IE.

**Deliverable associated with Task 1.3**

The deliverable for Task 1.3 will be conference calls and/or face-to-face meetings as needed.

**4.1.4 Task 1.4: Prepare draft report upon completion of the RFP process**

This report will cover all aspects of the RFP, and could include (but not be limited to) topics such as the number of bidders in the RFP, an overall review of the qualifications of the bidders, the process by which ESL developed its short list of bidders (criteria and weighting), the role of any utility self-build benchmark, and other relevant topics.

**Deliverable associated with Task 1.4**

The deliverable for Task 1.4 will be provided in the format typically used by the Commission.

**4.1.5 Task 1.5: Prepare final report**

Based on the draft report and feedback from Staff, LEI will prepare the final report on the RFP process.

**Deliverable associated with Task 1.5**

The deliverable for Task 1.5 will incorporate feedback from Staff and be provided in the format typically used by the Commission.

**4.2 Phase 2: Post-RFP process**

Based on the RFP requirements, LEI envisions that Phase 2 will consist of 11 tasks with associated deliverables (see Figure 3). This plan can be viewed as a starting point, as LEI understands that the LPSC and its Staff will have the right to determine how these tasks will be carried out.

**Figure 3. Phase 2, Major tasks**

- 
- 1 • reviewing certification applications, testimony, and exhibits
  - 2 • drafting and assistance in drafting, reviewing, and responding to discovery
  - 3 • analyzing responses to discovery requests
  - 4 • participating in formal status conferences, pre-trial conferences, depositions, and hearings
  - 5 • drafting and preparing pre-filed testimony in support of Staff's ultimate recommendations
  - 6 • reviewing and responding to rebuttal testimony
  - 7 • assisting in preparation of direct and cross-answering testimony
  - 8 • assisting in trial preparations
  - 9 • reviewing and analyzing stipulation terms, if any
  - 10 • assisting in drafting briefing sheets and Orders as needed
  - 11 • participating in conference calls, meetings, and conferences with the Commission and Staff, and attend B&E meetings

**4.2.1 Task 2.1: Review certification application, including testimony and exhibits**

LEI will examine ELL's to-be-filed application and evidence seeking approval of its RFP process, and its consistency with General Orders noted in Section 3.1 above. LEI will review all ELL's and intervenors' filings in this matter, or as required by Staff.

**Deliverable associated with Task 2.1**

The deliverable for Task 2.1 will be a memo containing LEI's initial findings about the implications of ELL's proposed RFP and its suitability in the MISO context, and initial findings on other relevant issues which may become apparent.

**4.2.2 Task 2.2: Assist in drafting, reviewing, and responding to discovery**

As part of the hearing process, LEI will work with Staff to identify issues and/or sticking points in filings, to ensure consistency with General Orders, MISO rules, and other issues.

LEI will provide support for drafting, reviewing, and responding to any discovery and information requests (“IRs”). LEI’s discovery questions for ELL and other intervenors would include requests for all data, computations, and analysis for LEI to examine in detail, as well as all assumptions which may have been implied but not made explicit in witnesses’ filings and reports. These may be propounded on interveners, experts, and ELL.

**Deliverable associated with Task 2.2**

The deliverable(s) under Task 2.2 will be a set of written discovery questions related to initial filings and testimony, and follow-up discovery questions if needed, related to rebuttal and surrebuttal testimony. These will be provided in the format typically used by the Commission.

**4.2.3 Task 2.3: Analyze responses to discovery questions**

LEI will analyze ELL’s responses to discovery questions for consistency with Commission Orders and in terms of how ELL’s intended RFP does or does not comport with best practices in the utility sector.

**Deliverable associated with Task 2.3**

The deliverable(s) under Task 2.3 will take the form of a memo or memos (depending on the number of rounds of discovery questions) and conference calls with Staff. These will be provided in the format typically used by the Commission.

**4.2.4 Task 2.4: Participate in formal status conferences, pre-trial conferences, depositions, and hearings**

LEI’s team is committed to participate these events as needed; LEI has had experience in each of the formal communications noted in Task 4.

**Deliverable associated with Task 2.4**

The deliverable(s) for Task 2.4 is participation in formal meetings in person, and/or conference calls, by LEI’s testifying witness, Marie Fagan. Dr. Fagan may be accompanied by other LEI staff as needed. She is available to be deposed as needed.

**4.2.5 Task 2.5: Draft and prepare pre-filed testimony in support of Staff’s ultimate recommendations**

LEI will draft and provide support for Staff’s ultimate recommendations, based on the findings from the previous tasks.

**Deliverable associated with Task 2.5**

The deliverable(s) under Task 2.5 will be written testimony provided in the format typically used by the Commission.

**4.2.6 Task 2.6: Review and respond to rebuttal testimony**

As part of the hearing process, in addition to drafting the direct testimony, LEI will also review materials submitted by other parties and their expert witnesses, and in accordance, prepare information requests as needed. LEI is equipped to produce responses and rebuttal testimony addressing any issues stemming from the scope of representation specified in the RFP.

**Deliverable associated with Task 2.6**

The deliverable(s) under Task 2.6 will be written rebuttal testimony, and written surrebuttal testimony as needed, provided in the format typically used by the Commission.

**4.2.7 Task 2.7: Assist in preparing direct and cross-answering testimony**

LEI will prepare direct and cross-answering testimony addressing any issues stemming from the scope of representation specified in the RFP.

**Deliverable associated with Task 2.7**

The deliverable(s) under Task 2.7 will be written direct testimony, written rebuttal testimony, and written surrebuttal testimony as needed, provided in the format typically used by the Commission.

**4.2.8 Task 2.8: Assist with trial preparations and cross examination of witnesses**

LEI has experience in developing comprehensive cross-examination questions in rate cases. In some instances, LEI has itself performed the cross examination; in others, LEI has provided background analysis and fundamental information, as well as cross-examination questions for use by counsel.

**Deliverable associated with Task 2.8**

The deliverable(s) under Task 2.8 will be a memo to Staff with cross-examination questions, organized by topic and theme.

**4.2.9 Task 2.9: Review and analyze stipulation terms**

LEI has experience reviewing stipulation terms in proceedings at the Commission. LEI will analyze how and whether any terms stipulated to by ELL reflect the principles of just and reasonable rates, and prudence.

**Deliverable associated with Task 2.9**

The deliverable(s) under Task 2.9 will be a memo to Staff, and conversations with Staff.

**4.2.10 Task 2.10: Assist in drafting briefing sheets and Orders as needed**

LEI has experience in supporting public utility Commissions in producing orders and decisions.

**Deliverable associated with Task 2.10**

The deliverable(s) under Task 2.10 will be provided in the format typically used by the Commission.

**4.2.11 Task 2.11: Participate in conference calls, meetings, and conferences with the Commission and Staff, and attend Business and Executive Sessions if needed**

LEI has broad experience in attending and presiding over technical conferences, providing oral testimony, and examining witnesses.

**Deliverable associated with Task 2.11**

The deliverables under Task 2.11 are in-person attendance at conference calls, scheduled hearings, open meetings, and other face-to-face by LEI's testifying witness, Marie Fagan. Dr. Fagan may be accompanied by other LEI staff as needed.

## 5 Timeline and budget

LEI expects to have a kick-off meeting soon after the signing of the contract to adjust the proposed plan of action to meet all LPSC requirements and expectations.

### 5.1 Timeline

As indicated in the RFP, the time period required for the matter is estimated at approximately 12 months. LEI expects that the schedule and the deadlines will be finalized during the kick-off meeting, or shortly before or after. LEI commits to having the key staff members noted in Section 2.2 available for the entire period of the project.

### 5.2 Professional fee budget (not-to-exceed)

For Phase 1, LEI offers a total professional fee budget not to exceed **\$25,360.00** (see Figure 4).

**Figure 4. Phase 1 professional fee budget by task**

Project task	Indicative work load in hours		
	Project Director	Project Researcher	Total hours
	Marie Fagan	Barbara Porto	
1. reviewing and commenting on RFP documents	5	5	10
2. participating in technical conferences and bidders' conferences, and informal meetings	20	5	25
3. coordination with Independent Monitor/Evaluator	10	10	20
4. preparation of draft report upon completion of the RFP process	5	20	25
5. preparation of final report upon completion of the RFP process	3	5	8
<b>Total hours</b>	<b>43</b>	<b>45</b>	<b>88</b>
Hourly rate	\$ 370.00	\$ 210.00	
<b>Total professional fees</b>	<b>\$ 15,910.00</b>	<b>\$ 9,450.00</b>	<b>\$ 25,360.00</b>

Note: This budget assumes LEI will not be examining individual bids.

For Phase 2, LEI offers a total professional fee budget not to exceed **\$71,840.00** (see Figure 5).

**Figure 5. Phase 2 professional fee budget by task**

Project task	Indicative work load in hours		
	Project Director	Project Researcher	Total hours
	Marie Fagan	Barbara Porto	
1. reviewing certification applications, testimony, and exhibits	10	10	20
2. drafting and assistance in drafting, reviewing, and responding to discovery	10	30	40
3. analyzing responses to discovery requests	10	40	50
4. participating in formal status conferences, pre-trial conferences, depositions, and hearings	3	20	23
5. drafting and preparing pre-filed testimony in support of Staff's ultimate recommendations	5	10	15
6. reviewing and responding to rebuttal testimony	8	24	32
7. assisting in preparation of direct and cross-answering testimony	10	12	22
8. assisting in trial preparations	8	16	24
9. reviewing and analyzing stipulation terms, if any	4	4	8
10. assisting in drafting briefing sheets and Orders as needed	4	4	8
11. participating in conference calls, meetings, and conferences with the Commission and Staff, and attend B&E meetings	20	10	30
<b>Total hours</b>	<b>92</b>	<b>180</b>	<b>272</b>
Hourly rate	\$ 370.00	\$ 210.00	
<b>Total professional fees</b>	<b>\$ 34,040.00</b>	<b>\$ 37,800.00</b>	<b>\$ 71,840.00</b>

The proposed budget is based on LEI's professional fee rates (see Figure 6) and the estimated number of hours to be dedicated to each task.

**Figure 6. LEI's professional fee rates**

Staff	Project role	Company position	Hourly rate	Daily rate
Marie Fagan	Project Director	Chief Economist	\$ 370	\$ 2,960
Barbara Porto	Project Researcher	Consultant	\$ 210	\$ 1,680

### 5.3 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 **\$2,000**. In addition, indicative travel costs are shown in Figure 7 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 travel expense budget will be approximately **\$2,445.00**.

**Figure 7. Indicative travel costs**

Travel	# trips	# people	# nights	Total cost
Meetings with Commission and/or Staff	1	1	1	\$ 815.00
Attend hearings and/or B&E meetings	1	1	1	\$ 815.00
Meetings with parties	1	1	1	\$ 815.00
<b>Total estimated costs</b>				<b>\$2,445.00</b>

**Indicative**

#### **5.4 Total budget**

The total indicative budget including professional fees, travel, and other expenses therefore amounts to **\$101,645.00**.



## **6 Conflict of interest**

LEI currently 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.

## **7 Resumes of key staff assigned to the project**

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## Marie N. Fagan, PhD

### *Chief Economist*



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#### **KEY QUALIFICATIONS:**

Marie Fagan is the Chief Economist at London Economics International, LLC, based in Boston, Massachusetts. With over 30 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. She has experience as a project manager for complex, multi-year engagements, including 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.

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 that 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 Markit). 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.

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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. She is former Vice President of Business for 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:	Chief Economist (Jan 2020 to present) Managing Consultant and Lead Economist (2016-2019) Managing Consultant (2014-2015)

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

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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>

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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:	<b>Decision Analysis Corporation of Virginia (DAC)</b>
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:	<b>US Department of Energy, Office of Policy, Planning and Analysis</b>
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>	February 2022 - present
<i>Location:</i>	Louisiana
<i>Organization:</i>	Louisiana Public Service Commission
<i>Description:</i>	<b>Review of integrated resource planning (“IRP”) process for three Louisiana utilities</b> LEI was engaged by Louisiana Public Service Commission, Docket No. I-36175 (Cleco Power), Docket No. I-36181 (Entergy Louisiana), and Docket No. I-36242 (SWEPCO), to assist to serve as the outside technical independent consultant in the process related to the IRP process for the three utilities. LEI reviewed and examined filings and pre-filed testimony; drafted, reviewed, and responded to discovery, and prepared direct and cross-answering testimony. LEI appeared at technical conferences and hearings and assisted with trial preparations as needed. Marie directed the three engagements and served as independent expert witness.

<i>Date:</i>	September 2021 – present
<i>Location:</i>	ERCOT
<i>Organization:</i>	Private client
<i>Description:</i>	<b>February 2021 winter storm impacts on ERCOT natural gas production and prices</b> LEI developed and examined data for natural gas production at the basin level in Texas, flows on intra-state and inter-state pipelines, prices at supply and market hubs, and use of gas by electric power plants and other customers in the state. Marie served as senior advisor to the project team.

<i>Date:</i>	July 2021 - present
<i>Location:</i>	Louisiana
<i>Organization:</i>	Louisiana Public Service Commission
<i>Description:</i>	<b>Audit of fuel costs of Cleco Power associated with the February 2021 Winter Storm Event</b> LEI was engaged by Louisiana Public Service Commission, Docket No. X-35990, to perform an audit of the Fuel Adjustment Clause (“FAC”) filings of Cleco Power related to costs incurred during the February 2021 Winter Storm Event. Marie supervised and directed the audit. In addition to the scope of services typically provided in an FAC audit, LEI also examined actions and decisions of Cleco Power leading up to and during the Winter Storm Event.

<i>Date:</i>	May 2021 - present
<i>Location:</i>	Louisiana
<i>Organization:</i>	Louisiana Public Service Commission
<i>Description:</i>	<b>Evaluation of utility green pricing option</b> LEI was engaged by Louisiana Public Service Commission, Docket No. U-35916, to serve as the technical consultant evaluating Entergy Louisiana LLC's application for authorization to implement a green pricing option, to be paid for by a Green Pricing Option ("GPO") or Large Volume Green Pricing Option ("LVGPO") rider, and related rate relief. LEI reviewed and examined filings and pre-filed testimony, assisted in drafting,

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	reviewing, and responding to discovery, prepared testimony, and conducted other activities related to the matter.
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<i>Date:</i>	April 2021 – present
<i>Location:</i>	ERCOT
<i>Organization:</i>	Private client
<i>Description:</i>	<p><b>February 2021 winter storm impacts on ERCOT energy prices</b></p> <p>For a law firm representing an ERCOT market participant, LEI conducted an analysis of the impact on hourly real time energy prices in ERCOT for the week of February 14, 2021. Marie served as co-author of report, filed in PUCT Project 51812, Item No. 207. <a href="https://interchange.puc.texas.gov/search/documents/?controlNumber=51812&amp;itemNumber=207">https://interchange.puc.texas.gov/search/documents/?controlNumber=51812&amp;itemNumber=207</a></p>

<i>Date:</i>	July 2021 – December 2021
<i>Location:</i>	Ohio
<i>Organization:</i>	Public Utilities Commission of Ohio
<i>Description:</i>	<p><b>Audit of Legacy Generation Resource (“LGR”) Riders of Duke Energy, AEP Ohio, and AES Ohio</b></p> <p>LEI was engaged by the Public Utility Commission of Ohio, to perform audits of the LGR Riders for three major Ohio electric distribution utilities. The LGR Riders are the mechanisms for passing to customers the costs of a power purchase contract with the Ohio Valley Electric Corporation (“OVEC”). Aspects of the audit included assessing the reasonableness and prudence of the disposition of energy and capacity in the PJM market of the energy provide by two coal plants owned by OVEC, as well as plant performance, compliance with environmental requirements, and the prudence of fuel purchases. LEI also audited charges and true ups related to the companies’ filings. Marie supervised and directed the audits.</p>

<i>Date:</i>	February 2021 - February 2022
<i>Location:</i>	New Jersey
<i>Organization:</i>	New Jersey Board of Public Utilities
<i>Description:</i>	<p><b>Natural gas capacity and non-pipeline alternatives</b></p> <p>LEI was engaged by the New Jersey Board of Public Utilities to examine current and future natural gas transmission capacity to serve demand from New Jersey’s local gas distribution utilities (Docket No. GO19070846). The purpose of the engagement was to determine if capacity on pipelines and from non-pipeline sources would be sufficient to meet demand from firm customers through 2030. LEI examined the capacity and contracting status of pipelines serving New Jersey. LEI examined design day demand projections from the LDCs and estimated impacts of New Jersey’s energy efficiency targets in the context of its Energy Master Plan and de-carbonization goals. LEI also looked at the role of third-party suppliers. LEI provided recommendations for addressing capacity issues. LEI also developed a playbook for identifying possible alternatives, including non-pipeline alternatives and new tariff mechanisms, for avoiding and/or responding to potential disruptions. Marie led the project.</p>



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<i>Date:</i>	August 2020 - present
<i>Location:</i>	Louisiana
<i>Organization:</i>	Louisiana Public Service Commission
<i>Description:</i>	<b>Audit of fuel adjustment clause of Entergy Louisiana</b> LEI was engaged by Louisiana Public Service Commission, Docket No. X-35523, to perform an audit of the Fuel Adjustment Clause filings of Entergy Louisiana. Marie supervised and directed the audit. The audit involved detailed examination of monthly true-ups of incurred costs with billed costs; the appropriate of interest rates as applied to over-recovered or under-recovered costs; examination of the impact of deferred costs; reconciliation of expenses recorded in FERC Form 1 account categories (“as booked”) with expenses included in monthly fuel adjustment clause filings; the prudence and reasonableness of costs incurred for oil, gas, coal, and nuclear fuel and transportation, and an assessment operating performance of utility generating assets.

<i>Date:</i>	July 2020 - present
<i>Location:</i>	Louisiana
<i>Organization:</i>	Louisiana Public Service Commission
<i>Description:</i>	<b>Audit of fuel adjustment clause of Cleco Power</b> LEI was engaged by Louisiana Public Service Commission, Docket No. X-35522, to perform an audit of the Fuel Adjustment Clause filings of Cleco Power. Marie supervised and directed the audit. The audit involved detailed examination of monthly true-ups of incurred costs with billed costs; the appropriate of interest rates as applied to over-recovered or under-recovered costs; examination of the impact of deferred costs; reconciliation of expenses recorded in FERC Form 1 account categories (“as booked”) with expenses included in monthly fuel adjustment clause filings; the prudence and reasonableness of costs incurred for oil, gas, coal, and lignite; and transportation; and an assessment operating performance of utility generating assets.

<i>Date:</i>	June 2020 – October 2020
<i>Location:</i>	Ohio
<i>Organization:</i>	Public Utilities Commission of Ohio
<i>Description:</i>	<b>Audit of PSR of Duke Energy</b> LEI was engaged by the Public Utility Commission of Ohio, to perform an audit of the Price Stabilization Rider (“PSR”) of Duke Energy Ohio related to Duke’s purchase of energy from the Ohio Valley Electric Corporation (“OVEC”) (PUCO Case No. 20-167-EL-RDR). Aspects of the audit included assessing the reasonableness and prudence of the disposition of energy and capacity in the PJM market of the energy provide by two coal plants, as well as plant performance, compliance with environmental requirements, and the prudence of fuel purchases. LEI also audited charges and true ups related to the company’s quarterly PSR filings. Marie supervised and directed the audit.

<i>Date:</i>	May 2020 – September 2020
<i>Location:</i>	Ohio
<i>Organization:</i>	Public Utilities Commission of Ohio
<i>Description:</i>	<b>Audit of PPA Rider of AEP Ohio</b>

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	LEI was engaged by the Public Utility Commission of Ohio, to perform an audit of the PPA Rider of AEP Ohio related to AEP’s purchase of energy from the Ohio Valley Electric Corporation (“OVEC”) (PUCO Case No. 18-1004-EL-RDR). Aspects of the audit included assessing the reasonableness and prudence of the disposition of energy and capacity in the PJM market of the energy provide by two coal plants, as well as plant performance, compliance with environmental requirements, and the prudence of fuel purchases. LEI also audited charges and true ups related to the company’s quarterly PPA filings. Marie supervised and directed the audit.
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<i>Date:</i>	April 2020 - May 2020
<i>Location:</i>	North Dakota
<i>Organization:</i>	Law firm
<i>Description:</i>	<b>Impacts of the potential shutdown of the Dakota Access pipeline (“DAPL”)</b> LEI was engaged by a law firm representing the plaintiff tribes to provide a Declaration in the matter of US District Court Case No. 1:16-cv-1534-JEB. Marie directed and led the research and prepared the Declaration as well as an in-depth report. The report covered issues including the long-term and near-term drivers of oil production in North Dakota, the drivers of global oil demand, the costs to transport oil by rail versus pipeline, and analysis of rail transport trends in the United States. She provided independent analysis as well as critiques of Declarations filed by other witnesses. Her declaration is available at: <a href="https://earthjustice.org/sites/default/files/files/3154-525_declarations-in-support-of-standing-rock.pdf">https://earthjustice.org/sites/default/files/files/3154-525_declarations-in-support-of-standing-rock.pdf</a>

<i>Date:</i>	February 2020 - present
<i>Location:</i>	Louisiana
<i>Organization:</i>	Louisiana Public Service Commission
<i>Description:</i>	<b>Rulemaking to study renewable energy tariff, aka “green tariff” options</b> Marie’s team supported the Louisiana Public Service Commission in Docket No. R-35423. LEI provided framing questions for stakeholder feedback on green tariff options, evaluated stakeholder responses, provided in-depth case studies of green tariffs in other US jurisdictions, and provided other consultatory services for the Commission.

<i>Date:</i>	January 2020 - June 2020
<i>Location:</i>	Massachusetts
<i>Company:</i>	Massachusetts Office of the Attorney General
<i>Description:</i>	<b>Application for firm transportation on a gas pipeline</b> The MA Attorney General's Office of Ratepayer Advocacy ("AGO") engaged LEI to examine the application of National Grid d/b/a Boston Gas for approval to execute a contract with Algonquin, for firm transportation (“FT”) on the Atlantic Bridge Project (DPU 19-132). Marie led the project which included examining National Grid’s projections of gas demand and its assumed resources to meet demand; examining the Assigned Precedent agreement for the FT as well as other documents; and providing a critique of the assumptions driving National Grid’s cost-benefit analysis. Marie reviewed briefs, developed interrogatory requests, and evaluated the responses to such requests.

<i>Date:</i>	November 2019
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<i>Location:</i>	Japan
<i>Organization:</i>	Private equity investor
<i>Description:</i>	<b>Long-term outlook for Japan electricity sector</b> LEI was engaged to prepare a brief, fact-based report that would help support a view of wholesale electricity prices in Japan after 2040. Marie authored the report, which covered i) the structure of Japanese electric power industry, and ii) the status of de-regulation and environmental policy. Based on this, Marie developed two reasonable scenarios for wholesale prices based on two different paths for energy supply to 2040 and beyond.

<i>Date:</i>	October 2019 – November 2019
<i>Location:</i>	ERCOT
<i>Organization:</i>	European investor-owned utility
<i>Description:</i>	<b>Investment environment for transmission in ERCOT</b> LEI was engaged by a European utility to examine the investment environment for transmission in ERCOT. Marie’s team provided a detailed report covering agents and institutions, the regulatory and legal framework, remuneration of investment, and transmission planning.

<i>Date:</i>	July 2019 - August 2019
<i>Location:</i>	Alberta, British Columbia
<i>Organization:</i>	Counsel for natural gas producer
<i>Description:</i>	<b>Analysis of Western Canadian natural gas costs and production</b> LEI was retained by counsel to provide support in the matter of NOVA Gas Transmission Limited (“NGTL”)’s application to the National Energy Board (“NEB”). LEI reviewed evidence and prepared testimony. Marie led analysis of the natural gas and natural gas liquids (“NGLs”) market in Alberta and British Columbia, and the impact of a pipeline surcharge on producers of natural gas.

<i>Date:</i>	May 2019 – August 2020
<i>Location:</i>	Massachusetts
<i>Organization:</i>	Investor-owned gas distribution utility
<i>Description:</i>	<b>Econometric benchmarking analysis of gas utility performance for PBR</b> LEI was engaged by Eversource in relation to its NStar Gas distribution company, to support NStar Gas’s rate filing for performance-based ratemaking. Marie led an econometric benchmarking analysis of utility performance and served as a testifying witness. The econometric analysis used a transcendental logarithmic cost function (a tried-and-tested methodology for providing empirical evidence in utility benchmarking cases) to help set expectations for further efficiency improvement and an appropriate stretch factor. The benchmarking report was used by counsel to develop the company’s strategy for the rate filing. Marie prepared direct written testimony, delivered oral testimony, developed interrogatory requests, responded to interrogatories by opposing counsel, and prepared rebuttal testimony. DPU Docket No. 19-120.

<i>Date:</i>	June 2019- December 2019
<i>Location:</i>	Ontario

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<i>Organization:</i>	Generating company
<i>Description:</i>	<b>Benchmarking generation utility performance</b> LEI was engaged to support a hydropower generating company in relation to its second-generation hydroelectric payment amounts price-cap application before the regulator. The project involved performing independent benchmarking analysis of OPG's regulated hydroelectric facilities. This project involved selecting an appropriate peer group, selection of appropriate metrics to be benchmarked, and model development. Marie created an econometric model to develop recommendations as to the appropriate stretch factor to apply. LEI also aided the company in public consultations and the regulatory process.

<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>	<b>Winter fuel reliability/electric power market design</b> 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 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).

<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>	<b>Econometric analysis of crude oil price and income elasticities of demand</b> 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.

<i>Date:</i>	September 2018-December 2018
<i>Location:</i>	United States, ISO-NE

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<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 ("AESCS"). 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 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. [Docket No. 2018-00321]</p>

<i>Date:</i>	June 2018-December 2018
<i>Location:</i>	United States, PJM
<i>Company:</i>	Public Utilities Commission of Ohio
<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. [Docket No. 18-80-EL-RDR]</p>

<i>Date:</i>	March 2018 - 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</p>

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	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.
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<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 2019
<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
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<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.

<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

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	should ask as part of its evaluation of potential transactions in the behind-the-meter solar sector.
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<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 renewable natural gas 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 methodology relied upon by the opposing counsel’s expert witness. 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



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<i>Description:</i>	<b>Due diligence in ERCOT</b> 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).
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<i>Date:</i>	June 2014-April 2016
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<i>Location:</i>	Maine
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<i>Company:</i>	Maine Public Utilities Commission
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<i>Description:</i>	<b>Project manager and testifying expert</b> 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.
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<i>Date:</i>	November 2015-December 2015
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<i>Location:</i>	US Northeast
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<i>Company:</i>	Renewable power developer
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<i>Description:</i>	<b>Due diligence for assets in ISO-NE (Maine)</b> 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 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
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<i>Location:</i>	ERCOT/ Texas
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<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,

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	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.
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<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.

**SPEAKING ENGAGEMENTS:**

**Selected recent webinars and conferences**

Energy Bar Association Mid-year Meeting and Conference 2021 (virtual). Session chair: *Securitization of utility costs: Panacea or poison pill?* October 13, 2021.

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International Association for Energy Economics (“IAEE”) 2021 Conference (virtual). Presentation title: *Liberalization, de-carbonization, and nuclear recovery in Japan: Outlook for long-term energy prices.* June 7, 2021.

Expert participant (virtual) in University of California Davis, Institute of Transportation Studies: *Future Scenarios of Passenger Mobility in the US: Year 2030*, October 2020.

Energy Bar Association Mid-year Meeting and Conference 2020 (virtual). Presentation title: *Performance-based ratemaking for local gas distribution companies: Lessons learned from a recent rate case.* October 13, 2020.

Boston Bar Association, 2020 Virtual Energy Conference. Session title: *Performance-based Ratemaking*. Presentation title: *Performance-based ratemaking: Understanding the basics, and the role of performance incentives.* July 15, 2020. <http://energyconference.bbablogs.org/>

Morgan Stanley Webcast Series | *Regulatory Outlook for Key Pipeline Projects with Experts Bloomberg and London Economics International*. Presentation title: *Impacts of a potential shutdown of Enbridge Line 5.* July 10, 2020.

US Association for Energy Economics, Webinar. Presentation title: *Taking a look ahead: The long-term impacts of a crisis on oil demand.* June 29, 2020. <https://www.usaee.org/webinars/webinar-kleinberg.aspx>

US Energy Association, Webinar. Presentation title: *Taking a look ahead: The long-term impacts of a crisis on oil demand.* May 27, 2020. <https://usea.org/event/taking-look-ahead-long-term-impacts-oil-demand-after-crisis>

USAEE/IAEE 37th Annual North American Conference. Denver, CO. Session chairman/moderator, concurrent session title: *Regulation*. November 6, 2019.

ASSA/IAEE. Atlanta, GA. Session title: *Single and bi-directional economic dependencies in energy systems*. Presentation title: *Business and innovation cycles in the US Upstream: Surviving the ups and downs.* January 2019.

MIT/SPE/YPE. Cambridge, MA. Session chairman/moderator, session title: *Meeting the changing demand for US natural gas: Do markets alone suffice or are regulatory changes necessary?* April 26, 2018.

ERCOT Market Summit. Austin, TX. Session chairman/moderator, session title: *Perspectives on ERCOT Market Reforms.* February 28, 2018.

ASSA/IAEE. Philadelphia, PA. Session title: *Energy Economics, Regime Changes, and Sustainability* Discussant for paper “What’s killing nuclear power in US electricity markets?” January 6, 2018.

## **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.

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“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

### **PUBLICATIONS:**

#### **Technical/Academic**

“Business Cycles and Innovation Cycles in the US Upstream Oil & Gas Industry” with Robert Kleinberg, PhD. USAEE Working Paper No. 19-423. December 2019. Social Science Research Network (“SSRN”). [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3508466](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3508466)

“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.

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“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 CERAWWeek* 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? CERAWWeek 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 CERAWWeek* 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

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*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

## Barbara Porto

### Consultant



#### KEY QUALIFICATIONS:

Barbara is a Consultant at London Economics International LLC (“LEI”), where she supports the firm’s technical engagements with regulators, utilities and private equity firms on issues regarding market design, project evaluations, wholesale price analysis, and utility management/performance auditing. Barbara is LEI’s lead expert and modeler for the Mexico and Latin America markets and provides advisory services on a variety of topics touching upon all aspects of the power sector value chain. Barbara also serves as a key modeler for LEI’s gas pricing model.

Prior to LEI, Barbara was an Analyst at ENEVA, the largest private thermal power generation company in Brazil, where she was responsible for market intelligence reports and procurement strategic planning.

#### EDUCATION:

Institution	Hult International Business School
Date:	August 2014
Degree(s) or Diploma(s) obtained:	MBA - Master of Business Administration

Institution	COPPEAD/UFRJ (Brazil)
Date:	December 2010
Degree(s) or Diploma(s) obtained:	Finance Certificate

Institution	Universidade Estácio de Sá (Brazil)
Date:	June 2010
Degree(s) or Diploma(s) obtained:	Bachelor of International Relations

#### EMPLOYMENT RECORD:

Date:	January 2015 - Present
Location:	Boston, MA
Company:	London Economics International LLC
Position:	Consultant

Date:	July 2008 - August 2013
Location:	Rio de Janeiro, Brazil



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Company:	ENEVA (subsidiary of E.ON AG)
Position:	Analyst (July 2010 – August 2013) Intern (July 2008 – June 2010)

**RECENT PROJECT EXPERIENCE:**

<i>Date:</i>	January 2015 to present
<i>Location:</i>	Mexico
<i>Company:</i>	LEI's Continuous Modeling Initiative (CMI)
<i>Description:</i>	As lead Mexico market modeler, Barbara tracks and evaluates the impact of on-going structural and regulatory changes in the electricity market to produce detailed price forecast and associated analyses on an ongoing semi-annual basis using LEI's in-house price forecast software, POOLMod.

<i>Date:</i>	August 2020 – present
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI has been engaged by a Regional Transmission Operator ("RTO") to conduct a holistic assessment of its FTR markets and ARR to determine whether the current ARR/FTR processes constitute appropriate mechanism to ensure that load receives the optimal value of the transmission system for which it is paying through its transmission access charges.

<i>Date:</i>	July – December 2019; July 2020 to present
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was engaged for a two-year term to conduct the annual management audits of the oil, gas, coal, nuclear fuel, and energy procurement activities of Mississippi Power Company. The LEI team assessed a complex array of issues including fuel and energy contract terms and the prudence of fuel procurement and inventory practices. LEI appeared before the Commission to present and defend findings. Barbara worked on the procurement and inventory management sections of the audit related to natural gas and coal.

<i>Date:</i>	July 2020 – present
<i>Location:</i>	Louisiana
<i>Company:</i>	Louisiana Public Service Commission
<i>Description:</i>	<b>Audit of fuel adjustment clause for Cleco Power</b> LEI was engaged by Louisiana Public Service Commission ("LPSC"), Docket No. X-35522, to perform an audit of the Fuel Adjustment Clause filings of Cleco Power. Barbara assisted with developing and analyzing data requests to evaluate if fuel costs were prudent and in compliance with LPSC orders.

<i>Date:</i>	January – March 2020
<i>Location:</i>	Massachusetts

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<i>Company:</i>	Massachusetts Office of the Attorney General
<i>Description:</i>	<b>Application for firm transportation on a gas pipeline</b> The MA Attorney General's Office of Ratepayer Advocacy ("AGO") engaged LEI to examine the application of National Grid d/b/a Boston Gas for approval to execute a contract with Algonquin, for firm transportation ("FT") on the Atlantic Bridge Project (DPU 19-132). The project included examining National Grid's projections of gas demand and its assumed resources to meet demand; examining the Assigned Precedent agreement for the FT as well as other documents; and providing a critique of the assumptions driving National Grid's cost-benefit analysis. Barbara assisted with reviewing briefs, developing interrogatory requests, and evaluating the responses to such requests.
<i>Date:</i>	January - March 2020
<i>Location:</i>	USA - Midwest
<i>Company:</i>	Distribution cooperative
<i>Description:</i>	LEI was retained by a Midwest cooperative seeking to cease purchasing supply from the incumbent and rather opt for an alternate supply provider. As part of the engagement, LEI prepared a critique of the stranded cost estimate provided by the incumbent provider and calculated its own estimate of the stranded cost payment based on FERC's policy guidelines in Order 888. LEI's calculation of market value for the released energy and capacity from the incumbent t provided was based on its own forecast of energy and capacity prices in the MISO markets. LEI's report was filed with FERC as part of the litigation procedures. Barbara was responsible for the capacity market analysis, reviewing thousands of capacity transactions in the MISO region.
<i>Date:</i>	April - December 2019
<i>Location:</i>	Canada
<i>Company:</i>	Ontario Power Generation ("OPG")
<i>Description:</i>	LEI was engaged to support Ontario Power Generation in relation to its second-generation hydroelectric payment amounts price-cap application before the Ontario Energy Board ("OEB"). The project involved performing an updated TFP study reflecting the OEB's 2017 Decision on the first-generation price-cap index. Other key tasks were the preparation of analysis and written evidence assessing whether the inflation factor and treatment of the Capacity Refurbishment Variance Account remain appropriate. Barbara worked on the inflation factor, physical TFP, coauthored the report and assisted on information-gathering.
<i>Date:</i>	November - December 2019
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	For a transmission developer in the in Northeast, LEI modeled various portfolios of renewable generation assets (including wind, solar, and hydro resources) together with various quantities and technologies of storage resource to analyze, and optimize, the capacity factor and delivered price for energy on the proposed HVDC transmission line. LEI also modeled customer load at the withdrawal end of the line together with additional storage to analyze the benefits of these storage resources to provide load-

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	following service. Barbara assisted with research on the costs and technical specifications of various storage technologies.
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<i>Date:</i>	October – November 2019
<i>Location:</i>	USA
<i>Company:</i>	Range EES
<i>Description:</i>	LEI was engaged by Range EES to analyze the local economic development benefits associated with the construction and operations of a Compressed Air Energy Storage (“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. Barbara assisted the REMI modeller with research, conducting model runs and in the composition of the final report.

<i>Date:</i>	March – April 2015; October 2015; May 2019
<i>Location:</i>	Colombia
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was hired by an electric operator for the purposes of valuing a portfolio of generating assets in Colombia. LEI’s scope of work consists of a comprehensive review of the Colombia energy market (including fuel and power market drivers), describe in detail the functioning of both wholesale power market and firm energy market (capacity market), develop forecasts of spot prices in order to derive expected revenues for the portfolio. Colombia being a hydro dominated system, as part of its modeling exercise, LEI ran a Monte Carlo simulation to develop a series of probabilities associated with generation profiles of Colombia’s hydro resources to reflect the impact of weather conditions and water inflows on hydropower plants’ output. LEI summarized its research and modeling results in a final report that was presented to lenders and other interested parties. In May 2019, LEI was hired to update the market fundamentals and energy prices outlook in order to evaluate the impact of evolving market conditions on a portfolio of assets acquired by the client in 2015. Barbara created the fuels forecast, assisted with research tasks for the modeling activities, and coauthored the report.

<i>Date:</i>	January – February 2019
<i>Location:</i>	Singapore
<i>Company:</i>	Singapore National Climate Change Secretariat (“NCCS”)
<i>Description:</i>	As part of a consortium, LEI was hired by the NCCS to undertake a study on effective carbon prices faced by energy-intensive manufacturing sub-sectors in jurisdictions across Asia, Middle East, Europe, and North America. Specifically, LEI was tasked with studying carbon policies in China, Middle East, Taiwan, USA, and Canada. The deliverables, consisting of a report and a dashboard tool, allowed the NCCS to compare effective carbon prices across competitor jurisdictions in these key manufacturing sectors and thus inform current and future policy decisions regarding the level of Singapore’s carbon price and wider climate change policy. Barbara was responsible for the Panama study.

<i>Date:</i>	January 2018 – January 2019
<i>Location:</i>	USA

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<i>Company:</i>	Public Utility Commission of Ohio
<i>Description:</i>	LEI was engaged in 2018 by the Public Utility Commission of Ohio to perform a management/performance audit of the Alternative Energy Rider of the Ohio Power Company (AEP Ohio). LEI examined processes involved in procuring RECs and SRECs. LEI compared and benchmarked AEP Ohio RECs and SRECs costs and other operational results against data from public sources. LEI created a working model of the true-up process and provided quantitative results comparing the impact of quarterly versus semi-annual true-up periods on the utility and on ratepayers. Barbara performed analysis on RECs benchmarking, inventory, and compliance, as well as the cost of compliance and the approach used by AEP Ohio to calculate the cost of RPS compliance.

<i>Date:</i>	July - December 2018
<i>Location:</i>	New England, USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained to assist in the review of the avoided energy supply costs as reported in the Avoided Energy Supply Cost ("AESC") 2015 - Update of December 16, 2016 and provide independently developed forecasts of energy supply costs and/or wholesale electricity and natural gas prices in New England. As part of the required services, the LEI undertook a review of the AESC and provided expert analysis of the AESC assumptions, methodology and results. LEI also advised the Commission and its staff with respect to the application of the AESC in the context of evaluating the cost effectiveness of energy efficiency measures. In addition, LEI provided independently developed energy supply costs and/or wholesale electricity and natural gas prices for the region that reflect current market conditions and outlooks. Barbara was responsible for the natural gas and other fuels price outlook review and performing natural gas forecast.

<i>Date:</i>	June - December 2017; July - November 2018
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was engaged by a public service commission to audit management activities of a major vertically-integrated utility in the MISO region. LEI assessed the utility's practices for economical purchase and use of fuel and electric energy, assessed 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. Barbara worked on the procurement and inventory management sections of the audit related to natural gas, oil, and coal.

<i>Date:</i>	July - August 2018
<i>Location:</i>	New York, USA
<i>Company:</i>	Confidential client
<i>Description:</i>	For an international client, LEI prepared a memo reviewing the performance of a generation asset in the NYISO wholesale markets. The memo included a review of the plant's competitive advantages and disadvantages from the point of view of its technology, operational characteristics, fuel procurement options, location with respect to transmission constraints. LEI's analysis also included a view on likely short and

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	medium market conditions, together with potential market developments, that could affect the plant's revenues. Barbara was responsible for the fuels and plant performance sections of the report.
<i>Date:</i>	March - August 2018
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	For a non-governmental organization ("NGO") LEI examined the current and future role of Enbridge Line 5 on oil consumers and producers in the State of Michigan. LEI's analysis covered a) the extent to which refineries which serve Michigan consumers require Enbridge Line 5 to provide crude oil; b) the extent to which consumers of propane in Michigan's Upper Peninsula rely on Enbridge Line 5; and c) the extent to which producers of crude oil in Michigan's Lower Peninsula rely on Enbridge Line 5. Barbara assisted with research tasks and coauthored the report.
<i>Date:</i>	May - July 2018
<i>Location:</i>	Maine, USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained to assess the financial viability of select biomass power plants in the next few years and confirm the plant's assertion that a discount on certain transmission costs was required in order to avoid plant closures. Barbara led the engagement, creating an estimated pro forma income statement to assess whether the select biomass plants are expecting to make positive (or negative) gross profit margin in the next few years, 2018-2021. The financial model presented a range of market revenues that the power plants can earn from the sale of energy, capacity, and RECs in ISO-NE's control area, relative to an estimate of going forward operating costs for two power plants. The model included five scenarios.
<i>Date:</i>	January - July 2018
<i>Location:</i>	USA
<i>Company:</i>	Maine PUC
<i>Description:</i>	LEI was retained by the Maine PUC to review and critique the analysis filed by Central Maine Power ("CMP") regarding the benefits to Maine resulting from the New England Clean Energy Connect ("NECEC"), which is a 1,200 MW HVDC Transmission Line from the Quebec-Maine border to Lewiston. The analysis includes work related to the regional energy markets, including the effect of the NECEC on a) wholesale energy, capacity, and ancillary service costs for Maine ratepayers b) impact on price volatility during natural gas price spike events; and c) greenhouse gas (GHG) reduction benefits. In addition, the analysis will also include work related to economic benefits to Maine from the NECEC including a) job creation, both direct and indirect; b) employment impacts from electricity price reductions and associated cost savings; c) economic development benefits and d) municipal tax revenues. Barbara was responsible for the natural gas price outlook review and performing natural gas forecast.
<i>Date:</i>	February - April 2018
<i>Location:</i>	USA

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<i>Company:</i>	Columbia University Center for Global Energy Policy
<i>Description:</i>	LEI was engaged by the Columbia University School of International and Public Administration's Center on Global Energy Policy ("CGEP") to conduct econometric analysis of global oil (crude oil and key refined products) demand and its income and price drivers. Barbara conducted a portion of the econometric analysis using STATA and coauthored the report.

<i>Date:</i>	November 2017 - March 2018
<i>Location:</i>	USA
<i>Company:</i>	PacifiCorp
<i>Description:</i>	LEI was retained as an independent evaluator ("IE") by PacifiCorp for its system-wide 2017 Solar RFP. LEI reviewed PacifiCorp's Solar RFP, facilitated and monitored communications between PacifiCorp and bidders, performed a review of the initial shortlist evaluation and scoring, and filed status reports and the IE closing report. Barbara coauthored the status and IE report, and managed the information-gathering and summarizing process, which involved information from over 100 bids, and multiple documents from each bidder.

<i>Date:</i>	August 2017
<i>Location:</i>	Canada
<i>Company:</i>	Confidential client
<i>Description:</i>	For a large utility, LEI performed a detailed bottom-up analysis of the range of costs for building a utility-scale solar farm in a Canadian province. LEI researched potential costs for multiple solar module technologies, interconnection options, and land types. The cost analysis customized the hardware, labor, and other costs into the province's business landscape so as to create an accurate representation of the costs for building a solar generation resource. Barbara assisted on the research, composition of the cost model and final report.

<i>Date:</i>	May 2017 - August 2017
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained to provide a research paper highlighting the opportunity to evolve system planning practices to a more resilient transmission system in the longer term, one that promotes efficient electricity production and consumption decisions and efficient infrastructure investment. Barbara assisted on the research tasks.

<i>Date:</i>	May 2017
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	For a private equity client, LEI reviewed all investable energy sectors in the US and Canada (except oil and gas exploration and production). The sectors included: electricity generation (natural gas, wind, solar, hydro), AMI, distributed Resources, demand response, retail and gentailers, gas LDCs, gas storage, gas pipeline transportation, LNG-related infrastructure, vertically-integrated utilities, electric distribution, and water

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	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. Barbara was responsible for the electric generation sector and the Alaska regional study.
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<i>Date:</i>	April 2017
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	For a private developer, LEI reviewed the eligibility of small (less than 25 MW) run-of-river hydroelectric electric generation facilities to provide ancillary services in the ISO-NE, MISO, NYISO, and PJM jurisdictions. Barbara assisted with research tasks.

<i>Date:</i>	December 2015 – April 2017
<i>Location:</i>	Canada
<i>Company:</i>	Ontario Power Generation (“OPG”)
<i>Description:</i>	LEI prepared a report for 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 total factor productivity (“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. This study was further updated for newly available data (encompassing operating costs and other statistics for calendar years 2013 and 2014). LEI also supported OPG through 2017 in recommending an appropriate X factor and I factor to use in a I-X regime for hydroelectric generation. Barbara coauthored the report and assisted on information-gathering.

<i>Date:</i>	December 2016
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	In 2014, LEI assessed the impact of the construction of the 1000 MW Pacifico HVDC transmission interline between Southern Peru and Northern Chile. LEI also provided due diligence support and market analysis for the Peruvian and Chilean electricity markets to the team of investors backing the project. In 2016, the model was updated to the current market condition. Barbara assisted with research tasks.

<i>Date:</i>	July – December 2016
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained by a transmission developer to serve 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. Barbara coauthored the IE report and managed the information-gathering.

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<i>Date:</i>	June 2016
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained by a transmission utility to provide an overview of resources in the Chicago area and the Commonwealth Edison (“ComEd”) zone and analyze the congestion of several nodes within the Chicago area and shorelines sites of Lake Michigan. Barbara assisted with research tasks.

<i>Date:</i>	June 2016
<i>Location:</i>	Brazil
<i>Company:</i>	Confidential client
<i>Description:</i>	For a Canadian electricity transmission company, Barbara conducted theoretical and empirical analysis of the Brazilian Electricity Market Credit Crisis highlighting interesting lessons for the Alberta market. Topics explored include: credit/financing issues, system reliability, government interventions, power market risks, resources diversity.

<i>Date:</i>	April - May 2016
<i>Location:</i>	Multiple
<i>Company:</i>	TransAlta
<i>Description:</i>	LEI was retained to provide ongoing research, analytical and advisory support to TransAlta as the Alberta government implements its climate change policy, which will shut down coal plants early, ramp up renewable generation, and put in place a province wide carbon tax. Part of the engagement was to perform a case study-oriented comparative review of ancillary services in North America and abroad. Barbara was responsible for the Ireland case study.

<i>Date:</i>	March 2016
<i>Location:</i>	Canada
<i>Company:</i>	Alberta Balancing Pool
<i>Description:</i>	LEI was retained by the Alberta Balancing Pool to provide wholesale energy price forecasts and market revenue projections over the period 2017-2020 for various generating facilities operating in the Alberta. LEI ran multiple sensitivities accounting for changes in ownership and dispatch rights, facility decommission and carbon policy changes. LEI relied on its proprietary dispatch simulation model, POOLMod applying Conjecture theoretical approach. Barbara assisted with research tasks.

<i>Date:</i>	October - November 2015
<i>Location:</i>	Multiple
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained as part of a consortium to support an energy product manufacturing firm assess the market for solar thermal technologies, with a focus on an economic assessment of solar thermal technology, assessing the value contribution of the different components of the value chain creating a molten thermal solar plant. In addition, the



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	client asked LEI to provide support to developing business strategies for this market. LEI's conducted the analysis in 3 out of 5 high priority markets - Saudi Arabia, Morocco, and Chile. More specifically we assessed the economics for solar thermal in each market, commented on the general perception of the technology and provided a comprehensive brief on the rules governing the market access. Barbara was responsible for the Chilean market.
<i>Date:</i>	June – October 2015
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained by the largest electric utility company in Malaysia, to conduct a capacity building workshop on performance-based regulation (“PBR”) and technical visits to utilities and regulators worldwide that are operating under PBR-like regimes. Barbara presented to TNB’s traveling contingent on PBR Requirements standards across different jurisdictions and on fundamental of Tariff Design.
<i>Date:</i>	June 2015
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained to categorize the different plants in PJM into self-supply, merchant or under PPA. Barbara assisted with research tasks.
<i>Date:</i>	May – June 2015
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was engaged by a private equity company to provide a briefing paper that compares “The Opportunities of the Buy versus Build Investment Decision.” 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. Barbara assisted with research tasks.
<i>Date:</i>	April 2015
<i>Location:</i>	Colombia
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was hired by a financial investor to provide an understanding of the dynamics underpinning hydro-dominated power markets as opposed to thermal systems. As part of this project, LEI reviewed in detail the dynamics and key drivers of energy markets in a sample of Latin America countries including Colombia, Panama, Brazil and Chile. Colombia was the point of focus of the report, in this respect LEI compared and contrast several aspects of the Colombian markets to other jurisdictions and created a scoring card to evaluate Colombia against similar jurisdictions. Barbara assisted with research tasks and coauthored the report.
<i>Date:</i>	January – February 2015
<i>Location:</i>	USA, Canada and Mexico

*London Economics International is US-owned and operated*

<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained by the client to conduct a mini-workshop to discuss the market opportunities and risks on five proposed transmission projects in the US and Mexico. Barbara was involved in the analysis of the Mexican projects.