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June 3, 2024

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Louisiana Public Service Commission  
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*Re: RFP 24-04,*

*Docket No. TBD, Entergy Louisiana, LLC, ex parte. Request for approval of Magnolia Power, LLC Capacity Credits Purchase Agreement.*

Dear Kimberly and Kathryn:

Please find attached London Economics International's ("LEI") proposal to act as an outside independent technical consultant and assist the Louisiana Public Service Commission ("LPSC") with Docket No. TBD. LEI offers a total indicative budget of \$69,050 including professional fees, travel, and other expenses.

LEI is uniquely qualified for this role. LEI has decades of broad experience in the electric utility sector and has previously worked with LPSC Staff on several projects, including analysis of Entergy Louisiana's Integrated Resource Plan and audits of Entergy's Fuel Adjustment Clause filings. LEI has examined procurement mechanisms and power purchase agreements in various jurisdictions and has served as an independent evaluator and monitor for resource procurements.

There are no actual or potential conflicts of interest for LEI in performing the contractual obligations contemplated in this RFP. 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,

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Chief Economist  
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# Proposal responding to RFP 2024-04 to assist LPSC Staff in Entergy Louisiana’s request for certification and approval of Magnolia Power, LLC Capacity Credits Purchase Agreement



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

June 3, 2024

*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 consultant in its review and analysis of Entergy Louisiana’s (“ELL” or the Company”) request for certification and approval of Magnolia Power, LLC Capacity Credits Purchase Agreement.*

*LEI is a leading energy consulting firm with 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, on tariffs, ratemaking, and renewable energy. LEI has worked with regulators, including the LPSC Staff, on many occasions and has experience in tariffs, procurement, and cost recovery mechanisms.*

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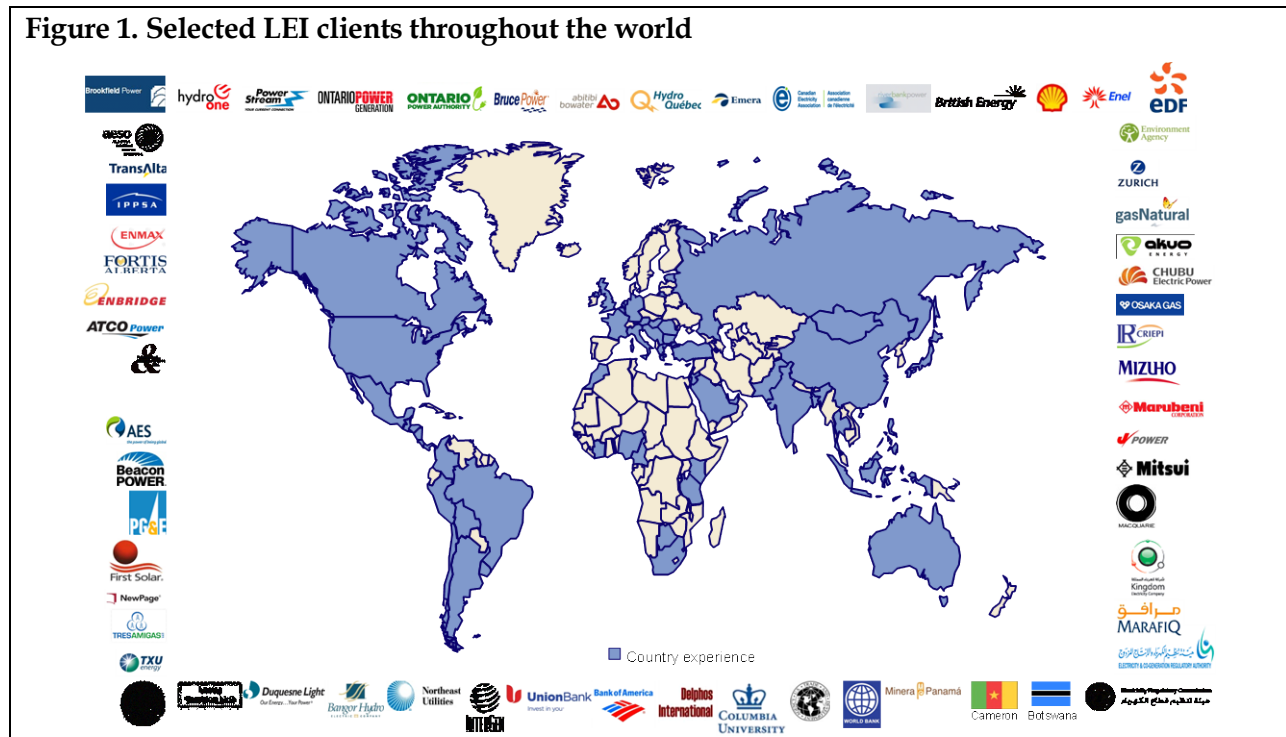
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## 1 Bidder information

LEI is a global economic, financial, and strategic advisory professional services firm specializing in energy and infrastructure. The firm combines a detailed understanding of specific network and commodity industries, such as electricity generation and distribution, with sophisticated analysis and a suite of proprietary quantitative models to produce reliable and comprehensible results. The firm had its start in the initial round of privatization of electricity, gas, and water companies in the United Kingdom. Since then, LEI has advised private sector clients, market institutions, regulators, and governments on policy initiatives, market and tariff design, asset valuation, market power, and policy, and strategy in virtually all deregulated markets worldwide (see Figure 1).



The following attributes make LEI unique:

- *clear, readable deliverables* grounded in substantial topical and quantitative evidence;
- *extensive experience with regulatory regimes, including renewable tariffs and procurement mechanisms* in which LEI has examined in detail renewable tariffs in regulated jurisdictions, and has served as independent evaluator for integrated utility procurements of generation resources;
- *wealth of knowledge of energy and infrastructure regulation* worldwide enables LEI to provide expert testimony services on regulatory best practices and innovation;

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- *balance of private sector and governmental clients* enables LEI to advise regarding both the impact of regulatory initiatives on private investment and the extent of possible regulatory responses to individual firm actions; and
- *US-wide and worldwide experience* backed by multilingual and multicultural staff.

LEI is well qualified to assist LPSC in all the aspects of the current matter:

- *LEI is active across North America's utility sector and has a comprehensive understanding of issues faced by utilities and regulators alike.* LEI's areas of expertise include procurement advisory, environmental products such as renewable energy credits ("RECs"), rate design, and cost recovery. LEI has supported regulators as well as utilities in cost-of-service ("COS") rate cases, and performance-based ratemaking ("PBR") cases.
- *LEI has extensive experience as a technical consultant and independent evaluator/monitor in competitive procurement, utility request for proposal ("RFP") processes, and resource acquisition:* LEI has worked on energy procurement issues for wholesale market participants and regulators and has a comprehensive mastery of the entire procurement process, from the initial phases of design and stakeholder consultation, through evaluation of bidder qualifications, RFP implementation, and bid evaluation.
- *LEI has worked on a variety of projects for the Commission Staff.* LEI is familiar with the unique aspects of the energy sector in Louisiana, and the Commission Orders which apply to the current matter. Among other projects for Staff, LEI has performed audits of Fuel Adjustment Clause ("FAC") filings of ELL and Cleco, and supported Staff in assessment of the Integrated Resource Plans ("IRPs") of ELL, Cleco, and the Southwestern Electric Power Company ("SWEPCO").

## **1.1 Background and staffing**

LEI is extremely well-qualified to serve as a technical consultant to the LPSC. As described in detail in Section 2, LEI has direct experience with renewable procurements, review of riders, forecasting energy and capacity prices, and renewable tariffs. 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 also understands the perspective and objectives of state regulators, having worked with many regulators, including LPSC. The firm has experience providing testimony to state commissions on various matters, including ratemaking, regulatory economics, cost allocation, utility audits, market power, retail competition, and other issues.

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, analytical and technical capabilities, experience with independent evaluation of utility procurement processes, and expertise in competitive power markets, including in the MISO region.

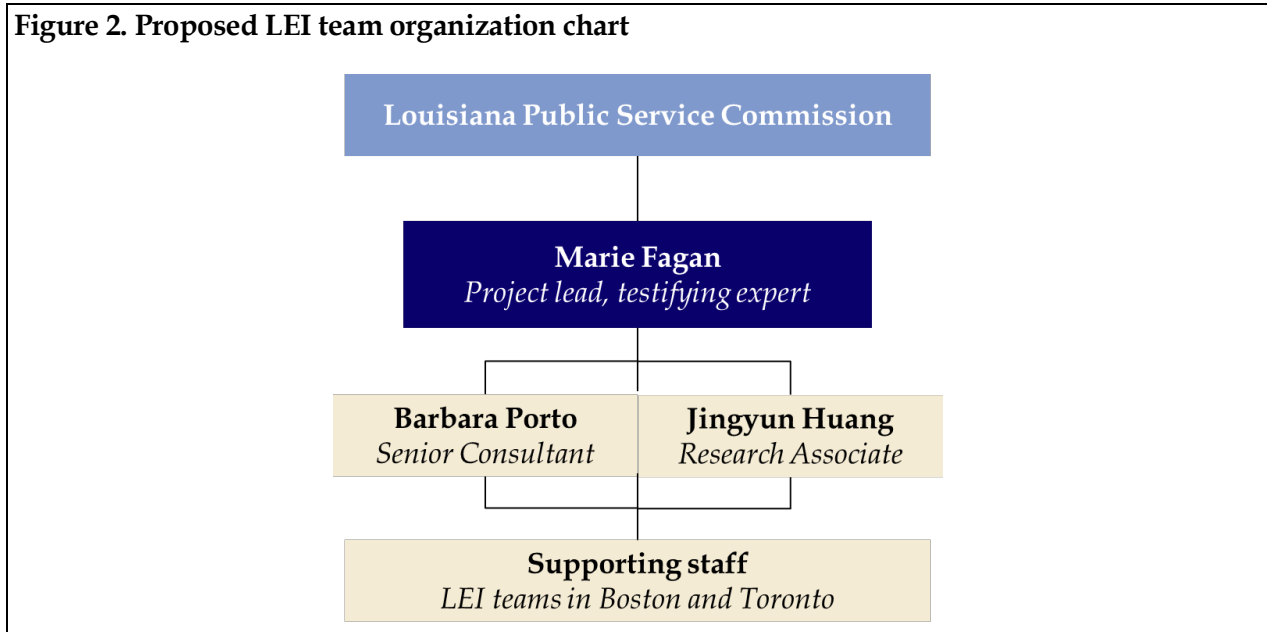
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There will be three key personnel assigned to this project. Additional staff members and resources will be available on an as-needed basis. Key staff members assigned are as follows:

- *Marie Fagan, Chief Economist*
- *Barbara Porto, Senior Consultant*
- *Jingyun (“Angela”) Huang, Research Associate*

*Marie Fagan* will serve as the project lead and testifying expert and will be the main point of contact with the Commission Staff. *Barbara Porto* will serve as Senior Consultant. *Jingyun Huang* will serve as a core team member. In addition, LEI staff will provide support as needed.

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



## 1.2 Brief bios of key staff assigned to the project

**Marie Fagan** is LEI’s Chief Economist. 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 the North American power sector. She has advised industry clients, financial clients, regulators, and public interest organizations. She serves as an expert witness in oil, gas, and electric power litigation and regulatory matters. Marie has served as Independent Evaluator (“IE”) of utility procurement (competitive solicitations) of solar and other resources; provided support for regulators in rate cases which include examination of cost recovery proposals; and studied renewable tariffs across US jurisdictions. She has also led several LEI engagements for the Commission.

**Barbara Porto** is a Senior Consultant at LEI where she lends her knowledge and skills to the firm’s technical engagements with regulators, utilities, and private equity firms in the US and abroad on issues regarding project evaluation, tariff design, investment strategic consulting, litigation support, as well as power price forecasting and market analysis. Barbara has worked on several procurement projects, including serving on the IE team for a solar RFP and an all-source RFP.

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Barbara also has experience working with the Commission, including the ELL FAC audit for 2016 to 2019 (Docket No. X-35523) and the Cleco FAC audit for 2018 and 2019 (Docket No. X-35522).

**Jingyun (“Angela”) Huang** is a Research Associate at LEI. Angela’s experience and subject matter focus includes utility rate cases, power market design, tariff design, renewable energy project evaluation, power market modeling, and market analysis.

Full CVs of the key team members are available in Section 6.

## 2 Qualifications and experience

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

### 2.1 Understanding of the engagement

On April 29, 2024, ELL filed a pre-file notice letter seeking Commission certification for a Capacity Credits Purchase Agreement ("Magnolia CCPA").<sup>1</sup> ELL's April 29<sup>th</sup> filing is intended to confirm that the application was filed and is per the Commission General Order dated September 20, 1983 ("1983 GO")<sup>2</sup>.

As mentioned in RFP 24-04, ELL has not yet filed their application, but it is expected to be similar to that filed in Docket U-34401. Thus, LEI understands that in the upcoming filing in the docket, ELL intends to provide:

1. ELL's future load and need for Magnolia CCPA;
2. Conformity with 1983 GO and Commission's Market-Based Mechanisms General Order ("MBM Order")<sup>3</sup>;
3. An explanation of the procurement process followed before signing the contract;
4. An overview of the PPA to be certified and cost recovery mechanisms; and
5. Testimony on behalf of ELL by experts.

LPSC is seeking an outside consultant to assist in the review and analysis of ELL's complete application. The review and analysis that LEI discusses in detail below will combine LEI's awareness of requirements of the relevant Commission Orders, familiarity with the competitive solicitation process, expertise in the range and implications for ratepayers of various kinds of renewable tariffs, and analysis of the impact of ELL's cost recovery (rate relief) proposal.

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<sup>1</sup> LPSC. RFP 24-04. *DOCKET NO. TBD, Entergy Louisiana, LLC, ex parte. In re: Request for approval of Magnolia Power, LLC Capacity Credits Purchase Agreement.* May 2, 2024.

<sup>2</sup> General Order dated September 20, 1983, In re: In the Matter of the Expansion of Utility Power Plant; Proposed Certification of New Plant by the LPSC, as amended by General Order (Corrected) in Docket No. R-30517 (In re: Possible modifications to the September 20, 1983 General Order to allow (1) for more expeditious certifications of limited-term resource procurements and (2) an exception for annual and seasonal liquidated damages block energy purchase) dated May 27, 2009.

<sup>3</sup> General Order, Docket No. R-26172 Subdocket A, In re: Development of Market-Based Mechanisms to Evaluate Proposals to Construct or Acquire Generating Capacity to Meeting Native Load, Supplements the September 20, 1983 General Order, dated February 16, 2004 (as amended by General Order, Docket No. R-26172 Subdocket B, dated November 3, 2006, and further amended by the April 26, 2007 General Order, and the amendments approved by the Commission at its October 15, 2008 Business and Executive Meeting and now in General Order, Docket No. R-26172, Subdocket C dated October 29, 2008)



### **2.1.1 Market-based Mechanisms (“MBM”) Order**

On October 29, 2008, the Commission issued its General Order in Docket No. R-26172, Subdocket C and Docket No. R-30517 (the market-based mechanism, or “MBM Order”). This ruling amended a process first established by a General Order in 2002. The MBM Order required that “[e]lectric utilities subject to the Commission's jurisdiction ... employ a market-based mechanism to support the acquisition of generating capacity or purchase power contracts intended to serve LPSC-jurisdictional retail customers. The results and analysis from employing this mechanism shall serve as part of the 'justification' required in paragraph (2) of the 1983 General Order.”<sup>4</sup> The MBM Order goes on to say that “The market-based mechanism shall be a Request for Proposal (“RFP”) competitive solicitation process. The utility may propose an alternative market-based mechanism or procedure if it can demonstrate that circumstances indicate that a formal RFP would not be in the public interest.”

LEI has extensive experience in evaluating utility procurements and will examine ELL’s application to ensure that it complies with the MBM Order. The MBM Order has 17 specific sections with which a utility must comply. For example, the Order requires the utility to submit an informational filing with the Commission, if the company wishes to implement the MBM for capacity investments or purchase power contracts. The filing must include the following items (among others):<sup>5</sup>

- *“Supporting information and documentation justifying the amount of capacity need and the proposed resources to be acquired.”*
- *“Supporting information and documentation justifying the type of resources which the electric utility proposes or expects to construct and/or acquire; along with resource alternatives considered but rejected.”*
- *“Proposed schedule for conducting and completing its RFP process and resource acquisition process. This would include the anticipated schedule for undertaking and completing any proposed power plant construction. This proposed schedule for conducting the RFP shall include adequate time for Staff review and discovery.”*
- *“A description of the methods and criteria that the utility intends to use to evaluate RFP bid responses.”*

LEI will examine whether ELL’s filings and complete application provide the information required by the MBM Order.

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<sup>4</sup> LPSC. *General Order* (Docket No. R-26127, Sub Docket C, R-30517). October 29, 2008.

<sup>5</sup> LPSC. *General Order* (Docket No. R-26127, Sub Docket C, R-30517). October 29, 2008. Attachment, Pp. 6-7.

## **2.1.2 1983 General Order**

The Commission's General Order dated September 20, 1983 ("1983 GO"), requires utilities to apply for a certification of public convenience and necessity for construction or contractual acquisition of energy or capacity (except for economy and emergency energy).<sup>6</sup> ELL's application is expected to seek approval of the terms, conditions, rights, remedies, and limitations outlined in the Magnolia PPA and thus an understanding of the 1983 GO would be important.

LEI will evaluate whether ELL's application is consistent with the requirements of the 1983 General Order.

## **2.1.3 Other ELL renewable options and tariffs, and what is additionally proposed by ELL**

LEI understands that the ELL application is likely to have various clauses such as rate relief, rate schedules, renewable options, and associated tariffs, which LEI will analyze as filed.

## **2.2 Selected experience**

In this section, LEI hand-picked a sample of projects highlighting the project team's experience relevant to the present engagement. The projects listed here are indicative of LEI's expertise and are not an exhaustive record of experience.

### **2.2.1 Competitive procurement mechanisms**

The LEI team has experience assessing procurement mechanisms (such as RFPs) used by utilities. Specific examples include:

- **Idaho Power Company All-Source 2028 RFP:** LEI was hired by Idaho Power Company to serve as an Independent Evaluator for its 2028 all-source energy (including storage) and capacity resources RFP ("2028 AS RFP"). The 2028 AS RFP was being issued to facilitate the sourcing of competitively priced resources capable of being commercially operational no later than June 1, 2028. The resources were needed to ensure IPC could address the needs identified in its latest Integrated Resource Plan (2023 IRP). The role of LEI as the IE was to oversee the competitive bidding to ensure that it was conducted fairly, transparently, and properly in congruence with the Oregon bidding rules. LEI was to ensure there was no bias in the procurement process, in particular a "self-build" bias that unjustly favors utility-owned resources. Moreover, LEI was tasked to develop a thorough evaluation process reflecting the procurement guidelines and apply it consistently to all resource bids received. Finally, LEI was requested to assist with OPUC with the monitoring of contract negotiations (all contracts associated with the winning bids). LEI's role consisted of documenting progress on key

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<sup>6</sup> LPSC General Order dated September 20, 1983 (*In re: In the Matter of the Expansion of Utility Power Plant; Proposed Certification of New Plant by the LPSC*), as amended by General Order (Corrected) in Docket No.R-30517 (*In re: Possible modifications to the September 20, 1983 General Order to allow (1)for more expeditious certification of limited-term resource procurement and (2) an exception for annual and seasonal liquidated damages block energy purchases*) dated May 27, 2009.

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contract terms, reporting on unexpected challenges and issues, and providing a detailed review of the process leading to contract agreement (or the termination of negotiations).

- ***Idaho Power Company All-source RFP:*** LEI was hired by Idaho Power Company to serve as an Independent Evaluator for its 2026 all-source energy (including storage) and capacity resources RFP (“2026 AS RFP”). The 2026 AS RFP was being issued to facilitate the sourcing of competitively priced resources capable of being commercially operational no later than June 1, 2026. The resources were needed to ensure IPC could address the needs identified in its latest Integrated Resource Plan (filed on December 30, 2021). The role of LEI as the IE was to oversee the competitive bidding to ensure that it was conducted fairly, transparently, and properly in congruence with the Oregon competitive bidding rules. LEI was to ensure there was no bias in the procurement process, in particular a “self-build” bias that unjustly favors utility-owned resources. Moreover, in addition to serving as an overseer of the procurement process, LEI was tasked to carry out a thorough independent review, evaluation and scoring of all submitted bids (consistent with Oregon’s competitive procurement guidelines) and compare findings to IPC’s.
- ***Independent evaluator for all-source RFP:*** LEI was engaged by the Oregon Public Utilities Commission as the Independent Evaluator (“IE”) for Idaho Power Company’s (“IPC”) 2023 All-Source RFP (Docket No. UM-2255). The project included a review and critique of IPC’s RFP, performing independent initial shortlist evaluation and scoring, examination of IPC’s models and approach to price and non-price scoring of bids (including IPC’s proposed inclusion of imputed debt as an adder to PPA bids), examination and assessment of risks related to IPC’s own benchmark bids, evaluation of modeling assumptions used by IPC in its market modeling for development of the optimal portfolio and final short list, and the filing of status reports and the final IE closing report.
- ***Independent evaluator for solar RFP.*** LEI was retained as the IE by PacifiCorp for its system-wide 2017 Solar RFP, for which over 100 bids were received. This included a review of the terms of the RFP, a review and scoring of bids (based on evaluation of minimum requirements such as credit worthiness, site control, demonstration of ability to meet the commercial online date, evidence of interconnection, and other scoring factors such as examination of costs and net benefits. It also included the facilitation and monitoring of communications between PacifiCorp and bidders, performing a review of PacifiCorp’s initial shortlist, and authoring status reports and the final IE closing report.
- ***Reviewed procurement process for Delaware Public Services Commission:*** Worked with the Staff of the Delaware Public Service Commission, LEI performed a review of the procurement process for the provision of Delmarva Power & Light Company (“Delmarva Power”)’s Standard Offer Service, and provided information and analysis regarding alternative long-term electricity procurement options for Delmarva Power to meet its Standard Offer Service residential and small commercial retail load to fulfil policy objectives at the lowest cost.
- ***IE and RFP manager for the Connecticut Department of Public Utility Control’s (“DPUC”) request for proposals for incremental capacity:*** LEI designed the procurement process, including the RFP and associated contracts, which solicited capacity from both supply side

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and demand side resources. LEI served as the RFP manager for the process, provided independent evaluation of the bids, and recommended the winning portfolio.

- ***IE for long-term electric capacity solicitation for PG&E:*** LEI was engaged to monitor long-term resource solicitations that involved affiliate, utility-owned or utility-turnkey bids, and all competitive tenders seeking products greater than two years in length. LEI worked with PG&E to ensure that offers were evaluated consistently and appropriately per the solicitation protocol and in accordance with applicable rules and processes of the California Public Utilities Commission (“CPUC”).
- ***IE for gas solicitation process for PG&E:*** For the utility’s Electric Fuels Department’s Natural Gas Storage Services Request for Offer (“RFO”), LEI worked to ensure that offers were evaluated consistently and appropriately in accordance with both the solicitation protocol and the applicable rules and processes of the CPUC.
- ***Independent Monitor in a multi-state renewables solicitation:*** For PacifiCorp’s renewable solicitation process for renewable power supplies, LEI reported to the Utah Public Service Commission (“Utah PSC”) and made filings with the Oregon regulator as well. The project included review and assessment of the solicitation process, documents, and modeling methodologies; valuation of the bidder approval process; development of review criteria; monitoring, auditing, and validation of bid evaluation process; bid evaluation; and contract negotiation.

## **2.2.2 Renewable tariffs and riders**

LEI has specific experience in evaluating renewable tariffs and riders. Specific examples include:

- ***Louisiana PSC technical support for rulemaking to study renewable energy tariff, aka “green tariff” options.*** LEI was engaged by the LPSC in Docket No. R-35423 to serve as the technical consultant for a renewable tariff option supporting the expansion of renewable energy in Louisiana. 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. LEI’s final deliverable provided options for renewable tariffs for Louisiana, based on LEI’s research of over forty renewable tariff programs in the United States; the assessment and scoring of the options was based on the goals of the Commission and feedback from Louisiana stakeholders. LEI found that both the subscriber-based model and the sleeved power purchase agreement model could meet the Commission’s goals, depending on how the details were structured.
- ***Louisiana PSC evaluation of ELL green tariff option:*** LEI was engaged by the LPSC, Docket No. U-35916, to serve as the technical consultant evaluating ELL’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, reviewing, and responding to discovery, prepared Staff reports, and conducted other activities related to the matter.

- **Public Utility Commission of Ohio (“PUCO”) audit of AEP Ohio’s Alternative Energy Rider:** LEI was engaged to perform a management performance and financial audit of AEP Ohio’s Alternative Energy Rider (“AER”), in Docket No. 18-80-EL-RDR. LEI examined the terms of PPAs for wind and solar power, the cost of RECs, energy, and capacity market prices; inventory strategies, the accuracy of AEP Ohio’s load forecasts, and the impact of the true-up process on utility customers.

### 2.2.3 Utility costs

LEI has experience in analyzing the operations, books, and records of investor-owned utilities, for the purpose of setting just and reasonable rates. Specific examples include:

- **Audit of fuel adjustment clause of 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; determining the appropriateness of interest rates 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 of 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; determining the appropriateness of interest rates 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 fuel and transportation, and an assessment operating performance of utility generating assets.
- **Management audits of Entergy Mississippi and Mississippi Power Company:** LEI was engaged by the Mississippi Public Service Commission (“MPSC”) to perform a two-year audit of the management activities of Entergy Mississippi. LEI assessed the utility's practices for economic purchase and use of fuel and electric energy, evaluated 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. 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 perform a similar audit of Mississippi Power Company, the other major vertically integrated utility in the state; following that two year-assignment, MPSC again engaged LEI for a two-year audit of Entergy Mississippi.
- **Audit of price stabilization rider of Duke Energy:** LEI was engaged by PUCO 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”). Aspects of the

audit included assessing the reasonableness and prudence of the disposition of energy and capacity in the PJM market of the energy provided 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.

- ***Audit of PPA rider of AEP Ohio:*** LEI was engaged by the PUCO to perform an audit of the PPA Rider of AEP Ohio related to AEP's purchase of energy from 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 provided 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.

#### **2.2.4 Revenue requirements, cost of service, and cost of capital analysis**

LEI has experience in the details of the elements of utility rate cases, including developing rate models, and reviewing cost of service and cost of capital parameters. Specific examples include:

- ***Support for regulator in COS rate case:*** LEI was engaged by the North Dakota Public Service Commission as the outside independent technical consultant supporting the Commission's ratepayer advocacy staff in a rate case involving Montana-Dakota Utilities ("MDU") (Case No. PU-22-194). LEI examined key components of the rate case, which included the depreciation study, tax rates, the cost of environmental upgrades, transmission investment, the proposed return on equity ("ROE") and common equity ratio, the impact of amortization of early retirement of coal plants, and the utility's cost of service and cost allocation proposal.
- ***COS study for cost allocation:*** LEI was retained to review the Alberta Energy System Operator ("AESO") 2018 Tariff Application with specific focus on the allocation of transmission costs using a 12-CP allocator as well as to confirm the accurate application of the AESO's cost of service methodology in its filed cost of service model.
- ***Cost of capital parameters review:*** LEI was retained by the Ontario Energy Board ("OEB") to provide updates on the macroeconomic conditions of the utility sector in Ontario. LEI provided recommendations on whether the cost of capital policy and/or methodologies for calculating and updating the parameters may warrant review due to structural changes in the sector. LEI also provided variance analysis/trend analysis of cost of capital parameters, including the ROE, and deemed long-term and short-term debt rates based on movements of relevant economic indicators.
- ***Cost of capital and risk factors:*** LEI was engaged by Ontario Power Generation ("OPG") to support senior management through regulatory processes related to performance-based rates. LEI prepared a discussion paper on incentive regulation mechanisms ("IRM") currently in place in Ontario for electricity and natural gas distribution utilities and presented it at a technical workshop at the OEB. LEI also provided expert testimony regarding cost of capital and risk factors associated with OPG's prescribed assets, as well as creating a risk-return continuum on which power sector assets could be placed.

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- **Revenue requirement:** LEI was retained by a large Canadian vertically integrated utility to assist with the creation of a comprehensive set of data requests to be submitted by the client in OEB case EB-2015-0275, the Independent Electricity System Operator's ("IESO") 2016 revenue requirement submission. LEI researched matters relating to the revenue requirement submission and past IESO fee applications, analyzed the cost allocation study prepared for the IESO, and proposed a detailed list of interrogatory requests on behalf of the client.
- **Rate case for Massachusetts utility:** LEI was hired to advise a gas utility company in Massachusetts on their performance-based distribution ratemaking filing. LEI performed a total factor productivity study and an econometric benchmarking analysis of utility performance. The reports were used by counsel to develop the company's strategy for the rate filing and were filed as testimony. LEI prepared direct written testimony, delivered oral testimony, developed interrogatory requests, responded to interrogatories by opposing counsel, and prepared rebuttal testimony. [Massachusetts DPU Docket No. 19-120].
- **Management of rate case filing:** LEI was retained by the largest electric utility company in Malaysia to provide project management services for the client's PBR submission. LEI's scope of work consisted of several tasks: proposing the policy and governance framework for the PBR submission; providing a detailed project plan; assessing the regulatory requirement model; ensuring accurate and timely delivery of workshops; and reviewing the filing before submission.

## 2.2.5 Rate design and tariff impacts

LEI has over a decade of experience in rate design and tariff design in the United States and globally. Specific examples include:

- **Investment incentives for electric distribution utility:** LEI served as independent expert for the Maine Public Utilities Commission ("MPUC") in its investigation of Central Maine Power Company ("CMP") management issues and related ratemaking and performance incentive mechanisms. Ultimately, the Commission's goal was to determine whether the rate plan to be proposed by CMP in a concurrent docket would be more suitable than the COS rate plan under which CMP was operating, given the parent company's incentives to invest in CMP. The project included a literature review of utility investment incentives and of multi-national entities' ("MNE") incentives to invest in subsidiaries. The project also included detailed case studies of performance-based ratemaking regimes in other US jurisdictions, and the role and effectiveness of performance incentives in the regimes. [Docket No. 2022-00038 (MPUC investigation), and Docket No. 2022-00152 (CMP rate case)].
- **Rate design for Kansas:** LEI was selected by the Kansas Legislative Coordinating Council ("LCC") to perform a study of the retail rates of Kansas public electric utilities. The purpose of the study was to inform electric sector policies and result in competitive electric rates and reliable electric service in Kansas. Part of the study focused on exploring options for retail electricity tariffs.

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- **Tariff design:** LEI provided Australia's market regulator economic advice on the appropriate regime for charging market participants for the costs incurred by the client in providing its services, in accordance with the National Electricity Code.
- **Tariff and regulatory training:** LEI was hired by the US Energy Association to provide technical assistance to the Haitian Energy Regulatory Agency. The work consisted of developing training materials for a three-week workshop on licensing, tariff design and ratemaking methodology, market restructuring, and institutional design best practices. The training was supplemented by a series of gap analysis reviews of current market structure, tariff policy, and regulatory practices in Haiti.
- **Comparison of rates for retail consumers:** LEI was retained by a power industry advocacy group to review rates charged to final consumers across Canada and identify distortions in rate design across provinces. LEI performed modeling to account for distortions and developed appropriate calculations to accurately compare rates across jurisdictions.
- **Rate impact study:** LEI was engaged by an industry association to perform a study of the impact of electricity rates on Ontario's manufacturing sector. The scope of work consisted of a review of Ontario industrial electricity rates and rate designs; assessment of competitive electricity rate levels; development of options to change rates in a manner consistent with rate setting principles and beneficial to industrial consumers and the Province; quantification of economic benefits from appropriate rate adjustments; and consultation with industry and government officials and experts.
- **Ratemaking mechanisms:** For the operators of Spain's natural gas high-pressure transport network and most of the country's natural gas distribution concessions, LEI performed a major comparative study of transport ratemaking mechanisms in jurisdictions where third-party access ("TPA" or "open access") to the gas transport infrastructure had been implemented. LEI provided the client with detailed information about ratemaking mechanisms, including asset valuation, cost of capital, and rate components.
- **Tariff review:** LEI was engaged by the Argentine regulatory authority to conduct a tariff review of Edenor, a large utility. The LEI-led consortium advised the regulator on international best-practice design of tariffs, proposed a tariff setting methodology, provided technical assistance in the analysis of information presented by Edenor, proposed tariffs, and assisted the regulator during public hearings.
- **Tariff design:** LEI was commissioned to support the Saudi Arabian power regulator in setting an electricity tariff. The work entailed data collection, assessment of costs of generation, transmission, and distribution, development of appropriate tariff setting methodologies, analysis of possible incentive mechanisms, drafting and creating regulatory tools, and helping to create the tariff review unit.

## 2.2.6 MISO region experience

LEI closely monitors the MISO market for ongoing client work and 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. Specific examples include:



- ***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 expiration of 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, 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 a regional transmission organization ("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. LEI also simulated an organized capacity market based on the resource adequacy requirements of MISO to estimate potential capacity revenues for the plants.

### **2.2.7 Other experience working for the Commission Staff**

In addition to projects for the Commission Staff listed above, LEI has worked on behalf of Staff in other matters. These include ELL's pending integrated resource planning ("IRP") case, in Docket No. I-36181.

- ***Review of IRP processes for three Louisiana utilities:*** LEI was engaged by LPSC in Docket No. I-36175 (Cleco Power), Docket No. I-36181 (Entergy Louisiana), and Docket No. I-36242 (SWEPCO), to serve as the outside technical independent consultant in the process related to the IRP processes for the three utilities. LEI reviewed and examined filings and pre-filed

testimony, developed informal data requests, participated in conference calls and meetings with Staff and the utilities; and prepared Staff Reports and Recommendations.

- ***LPSC Cleco Winter Storm 2021 Audit:*** LEI was engaged to audit and review the actions taken and decisions made by Cleco Power which impacted fuel costs incurred during the February 2021 winter storm. LEI's review and analysis included lessons learned and best practices to mitigate such impacts in the future.
- ***Louisiana PSC Entergy 2016-2019 FAC audit and CLECO 2018 and 2019 FAC audit:*** LEI was engaged by the Louisiana Public Service Commission to audit the Fuel Adjustment Clause ("FAC") for Entergy Louisiana and Cleco Power. The audits involved a detailed examination of monthly true-ups of incurred costs with billed costs; the appropriate 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.

### **2.2.8 Expert witness experience**

LEI has many years of experience in serving as an expert witness, on behalf of regulators as well as energy companies. Specific examples include:

- ***Expert witness on behalf of North Dakota Public Service Commission:*** LEI was engaged by the North Dakota Public Service Commission as the outside independent technical consultant supporting the Commission's ratepayer advocacy staff in a rate case involving Montana-Dakota Utilities ("MDU") (Case No. PU-22-194). LEI prepared data requests and provided written reports and oral testimony.
- ***Expert witness 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, Kansas, and sold under long-term contract to the Sacramento Municipal Utility District ("SMUD"). LEI's report demonstrated several flaws in the methodology of the opposing counsel's expert witness. LEI proposed an alternative, more appropriate methodology for valuing the green attributes of LFG, based on market fundamentals driven by the California renewable portfolio standard ("RPS") requirements.
- ***Expert witness on behalf of PUCO:*** LEI was engaged to perform an audit of the PSR of Duke Energy Ohio related to Duke's purchase of energy from OVEC (Case No. 20-167-EL-RDR); as well as to perform a similar audit related to such energy purchases by AEP Ohio (Case No. 18-1004-EL-RDR). Aspects of the audits 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 filings. LEI served as expert witness for PUCO in the hearings related to these audits.

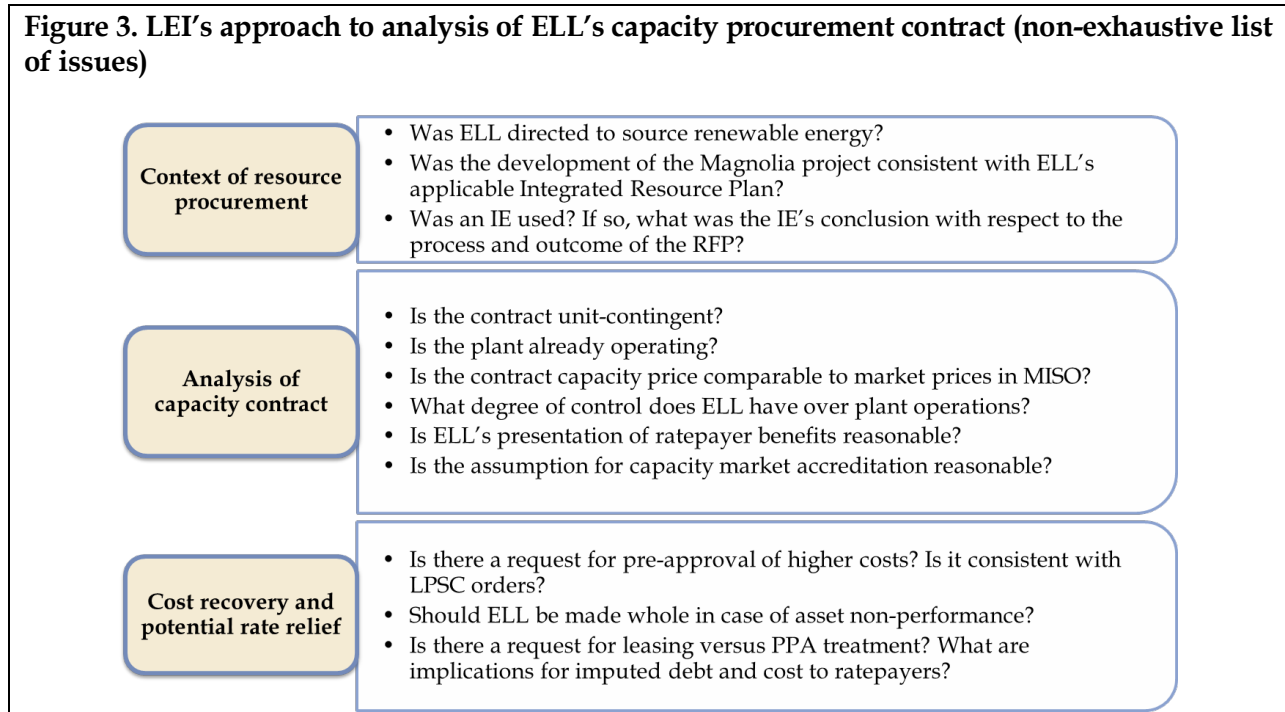
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- ***Expert witness assessing role of Enbridge Line 3:*** LEI served as independent market expert assisting the Minnesota Department of Commerce in evaluating the application of Enbridge Energy for a Certificate of Need for its Line 3 oil pipeline expansion project (Docket No. PL-9/CN-14-916, OAH Docket No. 65-2500-32764). LEI provided written testimony; responded to interrogatory requests, provided written surrebuttal, and oral testimony.
- ***Independent market expert, and expert witness for the Maine Public Utilities Commission:*** In a case involving the evaluation of the costs and benefits of alternatives for expansion of natural gas supply into Maine (MPUC Docket #2015-00071), LEI 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 served as an expert witness in the proceedings, providing oral and written testimony.
- ***Expert witness on behalf of Eversource Energy (NSTAR Gas) in its 2019 application to move to PBR:*** LEI's testimony provided expert technical analysis for NSTAR Gas performance-based ratemaking plan. More specifically, LEI presented a total factor productivity study as the basis for the X factor that NSTAR Gas used for its "I-X" rate escalation mechanism, and the results of an econometric-based total cost benchmarking study, which estimated the Company's efficiency relative to its peers. LEI responded to information requests by interveners and advised the client on issues raised by these interveners, provided direct oral and written testimony and surrebuttal testimony. [MA DPU Docket No. 19-120]
- ***Reasonableness of utility financing request:*** On behalf of a Midwestern distribution cooperative, LEI reviewed a generation and transmission ("G&T") cooperative's petition before the Indiana Utility Regulatory Commission ("IURC") for approval of \$300 million in financing for the next three years. LEI's review included an assessment of the information provided by the applicant regarding the planned capital expenditures, as the IURC's standard of review requires a determination that the application is in the public interest. LEI also assessed the various risks associated with the financing request, and how these risks could impact end-use customers, including the customers served by the distribution cooperative that retained LEI. LEI filed written testimony. [IURC Cause No. 45656]
- ***Stranded cost assessment:*** LEI was retained by Tipmont REMC ("Tipmont") to prepare an independent expert assessment of potential stranded costs for its early termination of a wholesale power supply agreement with Wabash Valley Power Association ("WVPA"). LEI's analysis was filed with the Federal Energy Regulatory Commission ("FERC") in February 2020; LEI testified in May 2021. [FERC Docket No. ER20-1041-000]
- ***Rate impact analysis and study of costs and benefits of municipalization:*** LEI was retained by the Maine Public Utility Commission to study proposed legislation that would involve municipalization of the state's transmission and distribution networks. LEI submitted its expert report for the Legislature on February 15, 2020, and testified before the Joint Standing Committee on Energy, Utilities and Technology on February 26, 2020. [MPUC Docket 2019-00280].

### 3 Proposed plan of action

LEI's approach will consider three broad categories of issues relevant to ELL's request: i) the context of the procurement of the Magnolia resource, ii) analysis of the capacity credits purchase contract, and iii) the cost recovery and rate relief requested by ELL. Within each of these three categories, there will be a number of issues which LEI will examine—see Figure 3 for a non-exhaustive list of issues to be covered by LEI's approach.

**Figure 3. LEI's approach to analysis of ELL's capacity procurement contract (non-exhaustive list of issues)**



The scope of work which encompasses this approach includes the following activities:

- Review all material in ELL's application including testimony;
- Draft data requests and review responses for both phases of ELL's application;
- Participate in informal meetings with Staff, ELL, and intervenors;
- Participate in formal status conferences, pre-trial conferences, depositions, and hearings;
- Assist in drafting recommendations, including testimony, to the Commission regarding ELL's application;
- Review and respond to any rebuttal testimony;
- Assist in preparing direct and cross-answering testimony;
- Respond to discovery propounded on Staff;

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- Assist in trial preparation, including cross-examination of witnesses and drafting pleadings and motions;
- Review and analyze potential stipulation terms;
- Testify before an administrative law judge, whether in a contested or stipulated hearing, and;
- Assist in the preparation of briefing materials for Staff and the Commissioners.

LEI has divided the work into two Phases.

In Phase 1, LEI will thoroughly review the complete filing and supporting documentation, draft data requests, and review responses. LEI will provide a draft Staff Report and Recommendations for Staff’s review, and a Final Staff Report and Recommendations for filing in the docket. Phase 1’s four topical areas (Tasks 1.1 through 1.2) are shown in Figure 4 below, along with related activities and deliverables (Tasks 1.3 through 1.6).

**Figure 4. Proposed action plan: Key tasks and deliverables**

Phase/ Task number	Phase and Task description	Form of deliverable
<b>1</b>	<b>Phase 1: Review all material in ELL's application</b>	
	<b>Task/activity</b>	
1.1	Examine filing and Commission Orders, applicable regulations, and precedents to determine if ELL's PPA complies with MBM Order and 1983 GO	Discuss preliminary findings on conference calls with Staff
1.2	Examine ELL’s cost recovery proposal, testimonies filed and any documents filed as part of the application	Discuss preliminary findings on conference calls with Staff
1.3	Draft data requests and review responses, as needed, related to above tasks	Written data requests propounded on ELL
1.4	Participate in informal meetings with ELL, Staff, and intervenors	Conference calls or in-person meetings
1.5	Compile all information and analysis into Draft Staff Report	Draft Staff Report and Recommendations
1.6	Prepare final Staff Report for filing in Docket	Final Staff Report and Recommendations
<b>2</b>	<b>Phase 2: Support for counsel, and testimony</b>	
	<b>Task/activity</b>	
2.1	Prepare additional formal discovery and supplemental discovery as necessary	Written discovery questions
2.2	Assist in drafting recommendations, including testimony	Written draft materials for review by Staff; final materials for filing
2.3	Assist in preparing direct and cross-answering testimony	Written draft materials for review by Staff; final materials for filing
2.4	Assist in trial preparations, including cross-examination of witnesses, and drafting of pleadings and motions	Written memos for Staff, with cross-examination questions, organized by topic and theme; in-person or virtual cross examination at hearings
2.5	Review and analyze potential stipulation terms	Discuss preliminary findings on conference calls with Staff
2.6	Testify before administrative law judge	In-person (or virtual) oral testimony
2.7	Respond to discovery propounded on Staff	Written responses including workpapers and spreadsheets with formulas intact if required

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In Phase 2, LEI will assist the Commission Staff in responding to discovery in the Staff's Report and Recommendation. LEI will plan to present expert testimony during a hearing(s) or contested case involving the docket. Dr. Marie Fagan will serve as the testifying expert for this engagement. LEI will assist in preparation of applicable motions and other pleadings in support of Staff's Report and Recommendation.

Dr. Fagan will also be available to appear before the Commission at the Commission's Business and Executive Sessions where this matter will be discussed.

### **3.1 Deliverables and schedule**

The team expects that the engagement will start with a conference call or otherwise virtual **kick-off meeting** with the Commission Staff. During this meeting, LEI expects that the engagement's timetable, milestones, overall expectations and format and timing of deliverables will be discussed and finalized. Given the timeline the RFP outlines, LEI understands that the selection of consultants is anticipated to take place at an upcoming June 2024 "Business and Executive Session." As such, LEI proposes the kick-off meeting be held by July 15, 2024.

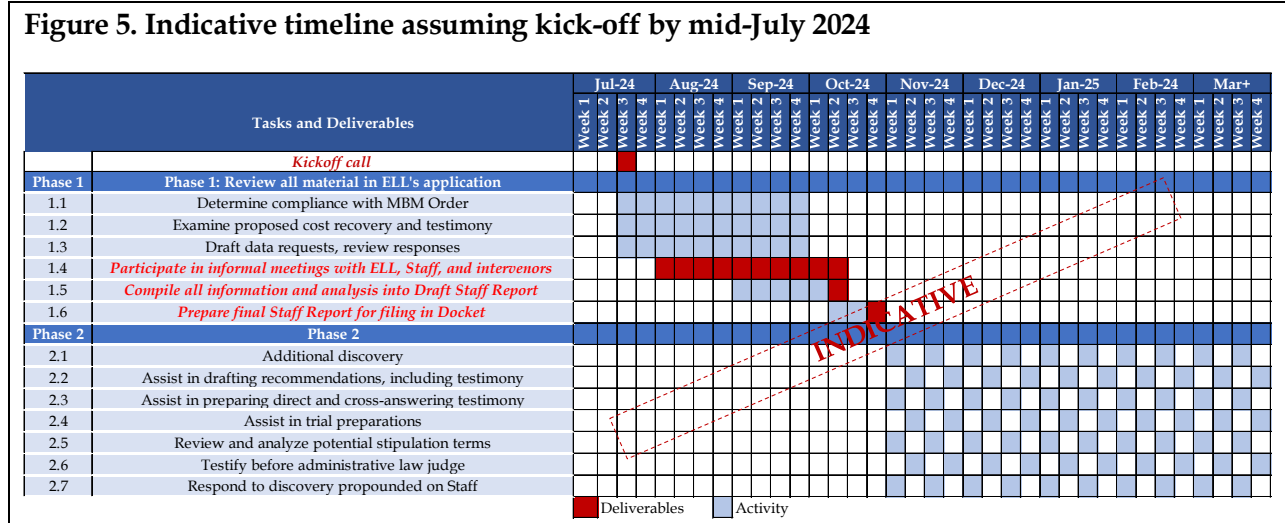
LEI understands that the timeline for review and analysis (Phase 1 in Figure 4 above) is 6-8 months. During the 6-8-month engagement for each annual review, LEI will summarize progress made on tasks and preliminary findings. LEI expects constant engagement with the Commission Staff in all stages of the project.

## 4 Timeline and budget

### 4.1 Timeline

As indicated in the RFP, the time allowed for the consultant’s review and analysis is 6-8 months. LEI also understands from previous experience with similar projects, that the consultant’s review of ELL’s application (LEI’s Phase 1) must be completed with enough time that the Commission can consider the completed review and testimony within 120 days of ELL’s filing. LEI has provided an indicative schedule in Figure 5, which may change when ELL has yet to file its initial application.

**Figure 5. Indicative timeline assuming kick-off by mid-July 2024**



LEI expects that the final schedule and the deadlines will be finalized during the kick-off meeting, or shortly before or after. LEI commits to having key staff members available for the entire period of the project.

### 4.2 Professional fee budget

LEI offers a total professional fee budget not to exceed **\$66,350** (see Figure 6), based on the scope discussed in Section 3. Performance of additional tasks not discussed in this scope would need an update of the professional fee budget.

**Figure 6. Professional fee budget (indicative)**

Phase/ Task	Phase 1 Task description	Total LEI staff hours	Professional fee budget
	Kickoff meeting	3	\$ 795
1.1	Determine compliance with MBM Order	30	\$ 6,775
1.2	Examine proposed cost recovery and testimony	17	\$ 4,315
1.3	Draft data requests, review responses	27	\$ 5,665
1.4	Participate in informal meetings with ELL, Staff, and intervenors	15	\$ 5,150
1.5	Compile all information and analysis into Draft Staff Report	4	\$ 8,900
1.6	Prepare final Staff Report for filing in Docket	38	\$ 8,560
	<b>Total</b>	<b>170</b>	<b>\$ 40,160</b>
	Phase 2 Task description	Total LEI staff hours	Professional fee budget
2.1	Prepare additional formal discovery and supplemental discovery as necessary	10	\$ 2,285
2.2	Assist in drafting recommendations, including testimony	12	\$ 3,025
2.3	Assist in preparing direct and cross-answering testimony	12	\$ 3,025
2.4	Assist in trial preparations	18	\$ 5,245
2.5	Review and analyze potential stipulation terms	10	\$ 2,755
2.6	Testify before administrative law judge	12	\$ 4,125
2.7	Respond to discovery propounded on Staff	24	\$ 5,730
	<b>Total</b>	<b>98</b>	<b>\$ 26,190</b>
	<b>Grand total</b>	<b>268</b>	<b>\$ 66,350</b>

Indicative

For Phase 2, LEI Chief Economist Marie Fagan would provide the expert testimony. This would be billed at a rate of \$370/hour. LEI is offering this at a substantial discount to LEI's current rates (see Figure 7). LEI will bill only for the actual costs associated with providing testimony and serving as an expert witness before the Commission during the applicable hearing.

**Figure 7. LEI hourly rates**

Title	Standard hourly rate	Discounted hourly rate
President	\$ 750	\$ 480
Managing Director	\$ 740	\$ 475
Director / Chief Economist	\$ 575	\$ 370
Managing Consultant	\$ 525	\$ 335
Senior Consultant	\$ 450	\$ 290
Consultant	\$ 325	\$ 210
Research Associate	\$ 210	\$ 135
Admin	\$ 100	\$ 65

### 4.3 Expense budget

LEI estimates that the additional cost for reasonable and customary reimbursable expenses, such as (but not limited to) printing, courier, and data acquisition fees, if any, will not exceed \$600. In addition, travel costs are estimated in 8 below. If travel is required, LEI will comply with all expense caps outlined in the State of Louisiana Division of Administration Travel Policies and



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Procedures Memorandum. The indicative travel expense budget is \$2,100 for one trip to Louisiana.

**Figure 8. Travel costs (indicative)**

Travel	# trips	# people	# nights	Total cost
Meetings with Commission and/or Staff	1	2	1	\$1,050
Meetings with parties	1	2	1	\$1,050
<b>Total estimated costs</b>				<b>\$2,100</b>

*Indicative*

**4.4 Total budget**

The total indicative budget, including professional fees, travel, and other expenses, therefore, amounts to **\$69,050**.

## **5 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.

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

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## **A.1 Marie Fagan**

### *Chief Economist, London Economics International LLC*

**Location: Boston, MA, USA**

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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 industry clients, financial clients, regulators, and public interest organizations. She serves as an expert witness in oil, gas, and electric power litigation and regulatory matters. Marie is experienced in the use of scenario analysis, an approach which helps clients identify potential turning points and arrive at decisions that are robust given the uncertainties inherent in any future set of market conditions.

At LEI, Marie leads LEI's utility management performance audit engagements and has been involved in performance-based ratemaking cases. She has experience as a project manager for complex, multi-year engagements, including a two-year project for the Maine Public Utilities Commission, and a two-year audit project for the Mississippi Public Service Commission. She has deep experience in econometric analysis.

Projects have included serving as independent expert witness for the Maine Public Utilities Commission, in the evaluation of the costs and benefits of new natural gas pipelines into New England, and independent expert witness for the Minnesota Department of Commerce in the matter of the CN application of Enbridge Energy for the Enbridge Line 3 oil pipeline expansion.

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.

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

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the US Association for Energy Economics (“USAEE”) and is a former member of the USAEE Strategic Planning Committee. She serves as a referee for the *Energy Journal*, the flagship academic publication of the International 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 (2020-present) Managing Consultant and Lead Economist (2016-2019) Managing Consultant (2014-2015)

Date:	2003-2014
Location:	Cambridge, MA
Company:	<b>IHS Markit (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 Building 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>

**PROJECT EXPERIENCE:**

<i>Date:</i>	September 2023 - April 2024
<i>Location:</i>	Maine
<i>Organization:</i>	Maine Office of the Public Advocate
<i>Description:</i>	<b>Examination of the costs and benefits of net energy billing</b> LEI was engaged by the Maine Office of the Public Advocate (“OPA”) to assist in examining the costs and benefits of Maine’s Net Energy Billing (“NEB”) programs. LEI’s methodology identified and quantified direct additional ratepayer costs, indirect ratepayer costs, and cross-subsidies. LEI’s final report, “Reducing the Cost of Solar Energy in Maine,” included an analysis of the impact of the NEB Kilowatt hour program on the cost of standard offer service, and an estimate of the opportunity cost of the NEB programs. Marie led the project.

<i>Date:</i>	August 2023 - March 2024
<i>Location:</i>	Maine
<i>Organization:</i>	Maine Public Utilities Commission
<i>Description:</i>	<b>Utility portfolio analysis</b> LEI was engaged by the Maine Public Utilities Commission to 1) identify options for selling the output from the portfolio of renewable energy resources procured by and under contract with two transmission and distribution (“T&D”); and 2) provide analysis of those options, including modeling of the various options for selling the output, to identify which options were most likely to maximize the value for Maine ratepayers. Marie led the project.

<i>Date:</i>	July 2024 - January 2024
<i>Location:</i>	United States, PJM
<i>Company:</i>	Public Utilities Commission of Ohio
<i>Description:</i>	<b>Management performance and financial audit of large utility</b> LEI was engaged to perform a management performance and financial audit of AEP Ohio’s Alternative Energy Rider (“AER”) for the period 2018 - 2022. 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 an accounting firm to perform the financial portion of the audit. [Case No. 23-0251-EL-RDR]

<i>Date:</i>	April 2023 - June 2023
<i>Location:</i>	Alberta
<i>Organization:</i>	ENMAX Energy



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<i>Description:</i>	<b>Assistance in performance-based ratemaking (“PBR”) filing</b> LEI assisted a large Alberta utility with its third generation PBR filing, including advising on incentives, effectiveness of inflation factors, potential for special capital expenditure provisions responsive to government electrification policies, productivity factors, length of regulatory period, and other matters associated with PBR. Marie provided expert advice related to analysis of total factor productivity (“TFP”) and cross-sectional benchmarking of the performance of electric and gas distribution utilities. [AUC Proceeding 27388]
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<i>Date:</i>	April 2023
<i>Location:</i>	Puerto Rico
<i>Organization:</i>	Paul Hastings LLC
<i>Description:</i>	<b>PREPA bankruptcy advisory</b> LEI was engaged to provide expert services in connection with the motion of the Financial Management and Oversight Board of Puerto Rico, as representative of the Puerto Rico Electric Power Authority (“PREPA”), and the Puerto Rico Fiscal Agency and Financial Advisory Authority for approval of a settlement with PREPA’s bondholders in PREPA’s PROMESA Title III case. LEI’s expert services included performing economic analyses, preparing an opening expert report, preparing a rebuttal expert report, sitting for a deposition, and testifying at the hearing on the motion. Marie provided expert analysis of the shortcomings of an opposing witness’s estimate of long-term electricity price elasticity.

<i>Date:</i>	March 2023 – April 2024
<i>Location:</i>	Idaho/Oregon
<i>Organization:</i>	Idaho Power Company/Oregon Public Utilities Commission
<i>Description:</i>	<b>Independent evaluator for all-source RFP</b> LEI was engaged by the Oregon Public Utilities Commission as the Independent Evaluator (“IE”) for Idaho Power Company’s (“IPC”) 2023 All-Source RFP. The project included a review and critique of IPC’s RFP, performing independent initial shortlist evaluation and scoring, examination of IPC’s models and approach to price and non-prices scoring of bids (including IPC’s proposed inclusion of imputed debt as an adder to PPA bids), examination and assessment of risks related to IPC’s own benchmark bids, evaluation of modeling assumptions used by IPC in its market modeling for development of the optimal portfolio and final short list, and the filing of status reports and the final IE closing report. Marie served as Senior Advisor and expert witness. [Docket No. UM-2255].

<i>Date:</i>	October 2022 - present
<i>Location:</i>	North Dakota
<i>Organization:</i>	North Dakota Public Service Commission
<i>Description:</i>	<b>Montana-Dakota Utilities (“MDU”) rate case</b> LEI was engaged by the North Dakota Public Service Commission as the outside independent technical consultant supporting the Commission’s ratepayer advocacy staff in a rate case involving MDU. LEI examined key components of the rate case, which included the depreciation study, tax rates, environmental upgrades, transmission

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	investment, the ROE/common equity ratio, the impact of amortization of early retirement of coal plants. LEI prepared data requests and provided written reports and oral testimony. Marie served as project manager and expert witness. [Case No. PU-22-194].
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<i>Date:</i>	July 2022 - December 2022
<i>Location:</i>	Maine
<i>Organization:</i>	Maine Public Utilities Commission
<i>Description:</i>	<b>Investment incentives for electric distribution utility</b> Marie served as independent expert for the Maine PUC in its investigation of Central Maine Power Company (“CMP”) management issues and related ratemaking and performance incentive mechanisms. Ultimately, the Commission’s goal was to determine whether the rate plan to be proposed by CMP in a concurrent docket would be more suitable than the current cost-of-service rate plan under which CMP operates, given the parent company’s incentives to invest in CMP. Marie led the project, which included a literature review of utility investment incentives and of multi-national entities' ("MNE") incentives to invest in subsidiaries. The project also included detailed case studies of performance-based ratemaking regimes in other US jurisdictions, and the role and effectiveness of performance incentives in the regimes. [Docket No. 2022-00038, and Docket No. 2022-00152].

<i>Date:</i>	May 2022 - October 2022
<i>Location:</i>	ERCOT
<i>Organization:</i>	Private client (law firm)
<i>Description:</i>	<b>Analysis of fair market prices for natural gas</b> LEI provided economic analysis and independent expert advice related to natural gas market activities in Texas during and around February 2021 in conjunction with Brazos Electric Power Cooperative, Inc. bankruptcy case in Texas. LEI provided an expert testimony report [Cause No. 21-03863]. Marie served as the project manager, natural gas expert, and a key witness.

<i>Date:</i>	April 2022
<i>Location:</i>	ERCOT/PJM/SPP
<i>Organization:</i>	Confidential client
<i>Description:</i>	<b>Regulatory and commercialization pathways for a renewable developer platform</b> LEI was engaged by a multinational energy company to support its due diligence of an acquisition of a 3000 MW+ portfolio of solar and wind development assets across PJM, ERCOT, and SPP. LEI performed a review of the state regulations and RTO markets for each asset, to evaluate the opportunities and risks around the commercialization paths for each asset. Marie led the analysis related to the ERCOT and SPP regions.

<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 LPSC in Docket No. I-36175 (Cleco Power), Docket No. I-36181 (Entergy Louisiana), and Docket No. I-36242 (SWEPCO), to serve as the outside technical

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	independent consultant in the process related to the IRP process for the three utilities. LEI reviewed and examined filings and pre-filed testimony, developed informal data requests, participated in conference calls and meetings with Staff and the utilities; and prepared Staff Reports and Recommendations. Marie directed the three engagements and served as independent expert witness.
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<i>Date:</i>	March 2022
<i>Location:</i>	Texas/ERCOT
<i>Organization:</i>	UT Austin Bureau of Economic Geology
<i>Description:</i>	<b>Expert contributor to study of gas distribution industry for Texas Railroad Commission</b> Following Storm Uri of February 2021, the Texas Railroad Commission was asked by the State of Texas to deliver an investigation of the value of underground storage for local gas distribution companies (“LDCs”), especially for coping with extreme weather conditions. The Bureau of Economic Geology at the University of Texas at Austin led the project. Marie provided insight into essential elements of the LDC gas supply procurement process, as well as best practices for winter supply security.

<i>Date:</i>	March 2022
<i>Location:</i>	Maine
<i>Organization:</i>	New England Aqua Ventus/Pine Tree Offshore Wind
<i>Description:</i>	<b>Economic impact of development of offshore wind in Maine</b> LEI was engaged by New England Aqua Ventus/Pine Tree Offshore Wind to evaluate the potential economic benefits to Maine of two scenarios for offshore wind project construction and operations based on floating offshore structures: NEAV’s 144-MW Research Array, and a commercial-scale buildout of 5,000 MW over a number of years. LEI utilized the IMPLAN economic model to estimate the economic impacts. Marie directed and led the project.

<i>Date:</i>	September 2021 – March 2022
<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,

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	LEI also examined actions and decisions of Cleco Power leading up to and during the Winter Storm Event.
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<i>Date:</i>	May 2021 – March 2022
<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, reviewing, and responding to discovery, prepared testimony, and conducted other activities related to the matter.

<i>Date:</i>	April 2021 – June 2021
<i>Location:</i>	ERCOT
<i>Organization:</i>	Private client
<i>Description:</i>	<b>February 2021 winter storm impacts on ERCOT energy prices</b> 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>

<i>Date:</i>	July 2021 – December 2021
<i>Location:</i>	Ohio
<i>Organization:</i>	Public Utilities Commission of Ohio
<i>Description:</i>	<b>Audit of Legacy Generation Resource ("LGR") Riders of Duke Energy, AEP Ohio, and AES Ohio</b> 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.

<i>Date:</i>	February 2021 - February 2022
<i>Location:</i>	New Jersey
<i>Organization:</i>	New Jersey Board of Public Utilities
<i>Description:</i>	<b>Natural gas capacity and non-pipeline alternatives</b>

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	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.
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<i>Date:</i>	August 2020 – August 2021
<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>

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	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, and served as expert witness on behalf of PUCO.
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<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> 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.

<i>Date:</i>	April 2020 - May 2020
<i>Location:</i>	North Dakota
<i>Organization:</i>	Public interest 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 – February 2022
<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
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<i>Location:</i>	Massachusetts
<i>Company:</i>	Massachusetts Office of the Attorney General
<i>Description:</i>	<p><b>Application for firm transportation on a gas pipeline</b></p> <p>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.</p>

<i>Date:</i>	November 2019
<i>Location:</i>	Japan
<i>Organization:</i>	Private equity investor
<i>Description:</i>	<p><b>Long-term outlook for Japan electricity sector</b></p> <p>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.</p>

<i>Date:</i>	October 2019 - November 2019
<i>Location:</i>	ERCOT
<i>Organization:</i>	European investor-owned utility
<i>Description:</i>	<p><b>Investment environment for transmission in ERCOT</b></p> <p>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.</p>

<i>Date:</i>	July 2019 - August 2019
<i>Location:</i>	Alberta, British Columbia
<i>Organization:</i>	Counsel for natural gas producer
<i>Description:</i>	<p><b>Analysis of Western Canadian natural gas costs and production</b></p> <p>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.</p>

<i>Date:</i>	May 2019 - August 2020
<i>Location:</i>	Massachusetts
<i>Organization:</i>	Investor-owned gas distribution utility

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<i>Description:</i>	<b>Econometric benchmarking analysis of gas utility performance for PBR</b> LEI was hired to be the advisor of a gas utility company in Massachusetts for their performance-based distribution ratemaking plan. Eversource hired LEI 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.
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<i>Date:</i>	June 2019- December 2019
<i>Location:</i>	Ontario
<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>



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	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.
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<i>Date:</i>	September 2018-December 2018
<i>Location:</i>	United States, ISO-NE
<i>Company:</i>	Maine Public Utilities Commission
<i>Description:</i>	<b>Avoided energy supply costs</b> 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]

<i>Date:</i>	June 2018-December 2018
<i>Location:</i>	United States, PJM
<i>Company:</i>	Public Utilities Commission of Ohio
<i>Description:</i>	<b>Management performance and financial audit of large utility</b> 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]

<i>Date:</i>	March 2018 - September 2018
<i>Location:</i>	United States, MISO, Michigan
<i>Company:</i>	NGO
<i>Description:</i>	<b>The role of Enbridge Line 5 in NGLs and crude oil transport in Michigan</b>

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

<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 independent initial shortlist evaluation and scoring, and the filing of status reports and the final IE closing report.

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<i>Date:</i>	April, May 2017
<i>Location:</i>	United States and Canada
<i>Company:</i>	Private client
<i>Description:</i>	<p><b>Review of investable energy sectors</b></p> <p>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.</p>

<i>Date:</i>	March 2017
<i>Location:</i>	Alberta, Canada
<i>Company:</i>	Private client
<i>Description:</i>	<p><b>Analysis of capacity markets</b></p> <p>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.</p>

<i>Date:</i>	February 2017
<i>Location:</i>	North America
<i>Company:</i>	Provider of services to vehicle fleet industry
<i>Description:</i>	<p><b>Outlook for electrification of transportation</b></p> <p>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.</p>

<i>Date:</i>	December 2016
<i>Location:</i>	Alberta, Canada
<i>Company:</i>	Private client
<i>Description:</i>	<p><b>Analysis of capacity markets</b></p> <p>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,</p>

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

<i>Date:</i>	October 2016-November 2016
<i>Location:</i>	California, Kansas
<i>Company:</i>	Law firm
<i>Description:</i>	<p><b>Support for counsel in renewable natural gas matter</b></p> <p>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.</p>

<i>Date:</i>	August 2016-October 2016
<i>Location:</i>	Maine
<i>Company:</i>	Maine Public Utilities Commission
<i>Description:</i>	<p><b>Macroeconomic impact of biomass generation</b></p> <p>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.</p>

<i>Date:</i>	May 2016
<i>Location:</i>	ERCOT/Texas

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

<i>Date:</i>	April 2016-May 2016
<i>Location:</i>	ERCOT/Texas
<i>Company:</i>	Renewable power investor
<i>Description:</i>	<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).

<i>Date:</i>	June 2014-April 2016
<i>Location:</i>	Maine
<i>Company:</i>	Maine Public Utilities Commission
<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 #2014-00071). 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
<i>Location:</i>	US Northeast
<i>Company:</i>	Renewable power developer
<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

<i>Date:</i>	October 2015-November 2015
<i>Location:</i>	ERCOT/ Texas
<i>Company:</i>	Private equity company
<i>Description:</i>	<b>Due diligence for assets in ERCOT</b> LEI was hired to forecast the potential energy revenues of two wind farms in Texas, using its proprietary dispatch model, PoolMod. Marie led the project, and also examined the implications of the PPA related to the two wind farms.

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

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

<i>Date:</i>	April 2015
<i>Location:</i>	Connecticut; New Jersey
<i>Company:</i>	Private equity company

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

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

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

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

<i>Date:</i>	April-May 2014
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<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.

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.

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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.

**PUBLICATIONS:**

**Technical/Academic**

Kleinberg, Robert and Fagan, Marie, "Business Cycles and Innovation Cycles in the U.S. Upstream Oil & Gas Industry." (December 1, 2019). USAEE Working Paper No. 19-423. Available at SSRN: <https://ssrn.com/abstract=3508466> or <http://dx.doi.org/10.2139/ssrn.3508466>

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

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

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

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

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

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

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

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

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

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

**US Department of Energy**

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

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

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

### **IHS/CERA Publications**

*Global Prospects for Shale Gas: Assessing Above-ground Risks and Enablers* IHS CERA Private Report 2013  
*The Impact of Technology on US Offshore Finding and Development Costs* IHS CERA Private Report 2013  
*The Next E&P Hotspots: What are the Leading Indicators?* IHS CERA Decision Brief 2012  
*Taking the Shale Gale International: Lessons from North America* IHS CERA Decision Brief 2012  
*Prospects for Shale Gas in Europe: Insights from CERAWEEK* IHS CERA Insight 2012  
*Envisioning a Long-term Future for Coal* IHS CERA Insight 2011  
*North American Power Industry Landscape 2011* IHS CERA Decision Brief 2011  
*Common Ground? CERAWEEK Perspectives on US Electric Power Transmission* IHS CERA Insight 2010  
*North American Power Industry Landscape 2010* IHS CERA Decision Brief 2010  
*Mexico’s Road to Renewable Power: The Cost of a Range of Targets and Options* IHS CERA Decision Brief 2009  
*Competitive Bidding: A Key Tool for Capital Formation in the US Power Sector* IHS CERA Decision Brief 2009  
*Financing the Global Power Business: Insights from CERAWEEK* IHS CERA Insight 2009  
*Concentrating Solar Power: US Demand Heats Up* IHS CERA Decision Brief 2008  
*US CO2 Policy Quandary: Near-term Reductions Imply a High Carbon Price* IHS CERA Private Report 2008  
*The US Energy Act of 2007: Addressing the Demand Side of Electric Power* IHS CERA Insight 2008  
*Investors’ Energy Monthly* December 2004 – November 2007  
*Some Sail, Some Fail: Utility M&A after PUHCA* IHS CERA Decision Brief 2006  
*Another Decade of Rising Upstream Costs?* IHS CERA Decision Brief 2006  
*Merchant Power’s Recovery: Four Dimensions of Value* IHS CERA Private Report 2006  
*PUHCA Repeal and Utility M&A: One Big Obstacle Down, Many Remain* IHS CERA Decision Brief 2005  
*North American Gas Monthly Briefing* January 2003 - June 2004  
*Costs are Up for North American Natural Gas* IHS CERA Decision Brief 2004  
*Bottom Line: A New Long-term Floor for North American Gas Prices* IHS CERA Private Report 2004  
*Upstream Gas Costs and North American E&P Strategy: Avoiding the Edge* IHS CERA Decision Brief 2004  
*Can We Drill Our Way Out of the (Natural Gas) Supply Shortage?* IHS CERA Decision Brief 2003  
*Cost-effective Deepwater Development: Seeing the Forest from the “Trees”* IHS CERA Private Report 2001  
*Optimization and the Role of R&D* IHS CERA Decision Brief 2001  
*Upstream Spending Plans: Inflation in the Pipeline* IHS CERA Alert 2001  
*Upstream Technology on the Horizon* IHS CERA Decision Brief 2000  
*Upstream Costs--Why the Gap will widen* IHS CERA Decision Brief 1999  
*The Impact of Falling Oil Prices on Upstream Operations* IHS CERA Decision Brief 1998  
*The Technology Revolution and Upstream Costs* IHS CERA Private Report 1998  
*Managing the Rig Shortage* IHS CERA Decision Brief 1997

### **News Media**

“Economists wonder: Did COVID-19 accelerate timeline for peak oil demand?” (excerpts from USEA webinar *Taking a look ahead: The long-term impacts of a crisis on oil demand*, May 27, 2020). S&P Global Market Intelligence. June 8, 2020.

[https://platform.mi.spglobal/SNL.Services.Export.Service/v2/Export/Retrieve?filename=Html\\_2bdf6b05-697e-4a2b-8768-579bf532b596.html](https://platform.mi.spglobal/SNL.Services.Export.Service/v2/Export/Retrieve?filename=Html_2bdf6b05-697e-4a2b-8768-579bf532b596.html).

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

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

**IHS/CERA CERAWeek Roles**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## **A.2 Barbara Porto**

*Senior Consultant, London Economics International LLC*

**Location: North Carolina, USA**



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### **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 California ISO’s energy and capacity markets, responsible for analyzing changes in market rules and system dynamics. 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:**

Hult International Business School, Cambridge, MA, United States, MBA - Master of Business Administration, 2014.

COPPEAD/UFRJ, RJ, Brazil, Finance Certificate, 2010.

UNESA, RJ, Brazil, Bachelor of International Relations, 2010.

### **EMPLOYMENT RECORD:**

**From:** 2015                                      **To:** present  
**Employer:**                                      *London Economics International LLC, Boston, MA, United States*  
Consultant

**From:** 2008                                      **To:** 2013  
**Employer:**                                      *ENEVA (subsidiary of E.ON AG), Rio de Janeiro, Brazil*  
Analyst

### **RECENT PROJECT EXPERIENCE:**

- **OPG TFP study 2019:** 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.

- ***Total Factor Productivity study:*** 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.
- ***Workshop on Incentive-Based Ratemaking (“IBR”):*** LEI was retained by the largest electric utility company in Malaysia, to conduct a capacity building workshop on IBR and technical visits to utilities and regulators worldwide that are operating under IBR-like regimes. Barbara presented to TNB’s traveling contingent on PBR Requirements standards across different jurisdictions and on fundamental of Tariff Design. Barbara presented to TNB’s traveling contingent on PBR Requirements standards across different jurisdictions and on fundamental of Tariff Design.
- ***Montana-Dakota Utilities rate case:*** LEI was engaged by the North Dakota Public Service Commission as the outside independent technical consultant supporting the Commission’s ratepayer advocacy staff in a rate case involving Montana-Dakota Utilities. LEI examined key components of the rate case, which included the depreciation study, tax rates, environmental upgrades, transmission investment, the ROE/common equity ratio, amortization for early retirement of coal plants, and impacts on residential rates versus impacts on other classes of service. LEI prepared data requests, and provided written and oral testimony. Barbara worked on the sections of the audit related to depreciation and environmental upgrades.
- ***LEI’s Continuous Modeling Initiative (CMI):*** As lead California market, 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.
- ***Consulting Services and Forecasts Related to Avoided Energy Supply Costs:*** 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.

- ***Management audit of Entergy Mississippi:*** LEI was engaged to conduct the annual fuel procurement and management audit of Entergy Mississippi. The LEI team assessed a complex array of issues including the Company's organization and staffing, risk management and company controls, coal procurement and inventory management, coal transportation, natural gas procurement and trading, plant operations and generation portfolio management, energy procurement and trading, and costs associated with the Grand Gulf nuclear plant. LEI prepared a comprehensive report detailing its analysis, findings, and recommendations, and appeared before the Mississippi Public Service Commission to present its findings and recommendations.
- ***Ancillary service revenue streams for long-duration storage in California:*** LEI was engaged by a developer to evaluate potential revenue stream of its battery storage technology that is capable in providing very long-duration storage. Specifically, LEI is helping the client understand the value of regulation, spinning reserve, frequency regulation, voltage support and other revenue streams that its battery can earn in the California market under current market structure and under future potential market designs.
- ***Financial Transmission Rights ("FTRs") and Auction Revenue Rights ("ARRs") Market Review:*** LEI has been engaged by a Regional Transmission Operator ("RTO") to conduct a holistic assessment of its FTR markets and ARRs 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. Barbara was responsible for analyzing the FTR/ARR metrics and target allocation process, as well as comparing it to similar mechanisms in other jurisdictions.
- ***Audit of Legacy Generation Resource Rider for Ohio Valley Energy Company:*** LEI was engaged by the Public Utility Commission of Ohio to perform an audit of the prudence and performance of the generation purchase riders of Duke Energy Ohio, AEP Ohio, and AES Ohio for the output of two coal plants operated by Ohio Valley Energy Company ("OVEC"). Barbara was responsible for examining OVEC's participation in the PJM market and the fuel and variable cost expenditures to determine whether they were prudently incurred.
- ***Due diligence on a potential wind portfolio acquisition:*** LEI was engaged by an infrastructure investment fund to provide consulting and advisory services in support of due diligence efforts on a potential wind portfolio acquisition in ISO-NE and California. The scope of the project included reviewing data room materials, critically reviewing a market report prepared by the sell-side consultant, preparing independent long-term 20-year energy and capacity price forecast for the target assets under two different scenarios, one reflecting a base case scenario with nation-wide carbon tax implemented by 2028, and another reflecting decarbonization goal achieved through non-carbon tax policies. Barbara was responsible for the California portion of the project, conducting extensive and detailed review of the materials provided, additional research on various topics, and performing the California modeling activities.
- ***Management audit of fuel adjustment clause for Entergy:*** LEI was engaged by Louisiana Public Service Commission ("LPSC"), Docket No. X-35523, to perform an audit of the Fuel Adjustment Clause filings of Entergy Louisiana, LLC. Barbara assisted with developing and

analyzing data requests to evaluate if fuel costs were prudent and in compliance with LPSC orders.

- ***Audit of fuel adjustment clause for Cleco Power:*** 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.
- ***Application for firm transportation on a gas pipeline:*** 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.
- ***Stranded cost assessment:*** 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.
- ***2019 Transmission + storage:*** 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-following service. Barbara assisted with research on the costs and technical specifications of various storage technologies.
- ***Economic development benefits of the CAES:*** 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.
- ***Fuel Audit of Mississippi Power Company:*** 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



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worked on the procurement and inventory management sections of the audit related to natural gas and coal.

- **Consultancy Study on Effective Carbon Prices:** 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.
- **Fuel Audit of Entergy Mississippi:** 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.
- **Audit of AEP Ohio Alternative Energy Rider:** 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.
- **Market and Economic Impact Consulting:** 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.
- **Natural gas generation asset performance review:** 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 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.

- ***Biomass power plants economics:*** 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.
- ***Enbridge Line 5:*** 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.
- ***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 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.
- ***Econometric study of oil demand elasticities:*** 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.
- ***IE for PacifiCorp 2017S RFP:*** 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.
- ***White paper for debunking myths surrounding transmission investment:*** 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

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production and consumption decisions and efficient infrastructure investment. Barbara assisted on the research tasks.

- ***Investment Opportunities in the US and Canada:*** 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 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.
- ***Hydro Ancillary Services:*** 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.
- ***Pacifico Chile-Peru interconnection assessment:*** 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.
- ***Transmission open 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. Barbara coauthored the IE report and managed the information-gathering.
- ***ComEd congestion analysis:*** 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.
- ***Brazilian electricity market credit crisis review:*** 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.
- ***TransAlta Climate Change 2016:*** 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.

- ***Alberta Market Modeling:*** 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.
- ***Assessment of solar thermal technologies:*** 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 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.
- ***Analysis of buy versus build investment decision:*** 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.
- ***Overview of hydro-dominated market:*** 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.
- ***Colombia market overview and revenue forecasts for target assets:*** LEI was hired by an electric operator for the purposes of valuing a portfolio of generating assets in Colombia. LEI's scope of work consists of a comprehensive review of the Colombia energy market (including fuel and power market drivers), describe in 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. LEI was hired later to update the market fundamentals and

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energy prices outlook in order to evaluate the impact of evolving market conditions on a portfolio of assets acquired by the client. Barbara created the fuels forecast, assisted with research tasks for the modeling activities, and coauthored the report.

- ***Transmission project workshop:*** LEI was retained by a private 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.

### A.3 Jingyun Huang (Angela)

*Research Associate, London Economics International  
LLC*



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#### KEY QUALIFICATIONS:

Jingyun is a Research Associate at London Economics International LLC (“LEI”) Boston Office, where she applies her knowledge and analytical skills in energy markets and brings experience in energy transitions to the firm’s engagements with government bodies, regulators, utilities and private equity firms on issues regarding market and tariff design, project evaluations, wholesale price analysis, and utility management/performance auditing. Jingyun is LEI’s electricity market modeler for NYISO, responsible for analyzing changes in market rules and system dynamics.

Jingyun received her Master of Arts in International Relations from Johns Hopkins University, School of Advanced International Studies in 2022, concentrating in Energy, Resources, and Environment, and holds a Bachelor of Laws in Political Science from Peking University. Prior to LEI, she worked at International Energy Agency, focusing on energy transition issues in China and was responsible for the agency’s stakeholder engagement in Asia Pacific. She has also worked as a Graduate Consultant for World Bank Group investigating Kazakhstan’s oil and gas sector. Jingyun is fluent in English and Mandarin Chinese.

#### EDUCATION:

Institution	Johns Hopkins University – School of Advanced Studies
Date:	May 2022
Degree(s) or Diploma(s) obtained:	M.A. - Master of Arts in International Economics and Relations
Institution	Peking University
Date:	July 2020
Degree(s) or Diploma(s) obtained:	L.L.B. – Bachelor of Laws in Political Science
Institution	Columbia University
Date:	May 2019
Degree(s) or Diploma(s) obtained:	Semester Exchange

#### EMPLOYMENT RECORD:

Date:	August – Present
Location:	Boston, MA
Company:	London Economics International LLC

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Position:	Research Associate
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Date:	February 2022 - May 2022
Location:	Bonn, Germany (Remote)
Company:	United Nations Climate Change (UNFCCC)
Position:	Capacity-building and Negotiations Intern

Date:	January 2022 - May 2022
Location:	Washington DC, United States
Company:	World Bank Group
Position:	Graduate Consultant

Date:	July 2021 - January 2022
Location:	Paris, France
Company:	International Energy Agency
Position:	Policy Analyst

**RECENT PROJECT EXPERIENCE:**

<i>Date:</i>	September 2022 - present
<i>Location:</i>	New York
<i>Company:</i>	LEI's Continuous Modeling Initiative (CMI)
<i>Description:</i>	As lead New York market modeler, Jingyun 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>	November 2022 - January 2023
<i>Location:</i>	New York
<i>Company:</i>	Confidential client (electric utility)
<i>Description:</i>	<p><b>Modeling of ELCC Accreditation Curve for Battery Storage</b></p> <p>LEI was retained by a large electric utility to provide due diligence support on their renegotiation of long-term contracts. The utility aimed to commercialize a battery storage project in NYISO by 2026. Jingyun analyzed the key aspects of NYISO's accreditation proposal and how it would affect battery energy storage, and used ELCC approach to estimate the potential Capacity Accreditation Factor of the project in multiple capacity zones, in turn to derive the project's UCAP for the considered years.</p>

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<i>Date:</i>	October 2022 – January 2023
<i>Location:</i>	North Dakota
<i>Company:</i>	North Dakota Public Service Commission
<i>Description:</i>	<p><b>Montana-Dakota Utilities Rate Case</b></p> <p>LEI was engaged with the North Dakota Public Service Commission as an independent technical consultant, supporting the Commission's rate case involving Montana-Dakota Utilities. LEI examined key components of the rate case, which included the depreciation study, tax rates, environmental upgrades, transmission investment, the ROE/common equity ratio, amortization for early retirement of coal plants, and impacts on residential rates versus impacts on other classes of service. LEI prepared data requests, and provided written and oral testimony. Jingyun worked on the sections related to transmission investments and riders, as well as taking charge of the tracking system of data requests. [Case No. PU-22-194]</p>

<i>Date:</i>	August 2022 – ongoing
<i>Location:</i>	Mississippi
<i>Company:</i>	Mississippi Public Service Commission
<i>Description:</i>	<p><b>Management Audit of Entergy Mississippi</b></p> <p>LEI was engaged to conduct the annual fuel procurement and management audit of Entergy Mississippi. The LEI team assessed a complex array of issues including the Company's organization and staffing, risk management and company controls, coal procurement and inventory management, coal transportation, natural gas procurement and trading, plant operations and generation portfolio management, energy procurement and trading, and costs associated with the Grand Gulf nuclear plant. LEI prepared a comprehensive report detailing its analysis, findings, and recommendations, and appeared before the Mississippi Public Service Commission to present its findings and recommendations. Jingyun investigated in the nuclear plant and power purchase agreement, analyzing their nuclear fuel cycle, purchasing process, responds to the market changes, and nuclear fuel costs and efficiency as well as the cost and revenues under the power purchase agreement for Grand Gulf.</p>

<i>Date:</i>	August 2022 – ongoing
<i>Location:</i>	Maine
<i>Company:</i>	Maine Public Utilities Commission
<i>Description:</i>	<p><b>CMP Investment Incentives</b></p> <p>LEI assisted the Maine PUC in its investigation of Central Maine Power Company management issues and related ratemaking and performance incentive mechanisms. Ultimately, the Commission's goal was to determine whether the rate plan proposed by CMP would be more suitable than the current cost-of-service rate plan under which CMP operates, given Avangrid/Iberdrola's incentives to invest in CMP. Jingyun developed detailed case studies of performance-based ratemaking regimes in New York and other US jurisdictions, and the role and effectiveness of performance incentives such as storm response mechanism in the regimes.</p>