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May 2, 2023

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

Re: RFP 23-14,

Docket No. X-TBD- Louisiana Public Service Commission, ex parte, In re: Audit of Federal Environmental Adjustment Clause Filings for Southwestern Electric Power Company for the Period of January 2020 through December 2022.

Dear 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. X-TBD referenced above. LEI offers a total indicative budget of **\$40,165** including professional fees, travel, and other expenses.

LEI is uniquely qualified for this role. First, LEI has decades of broad experience in the electric utility sector, and has previously worked with LPSC Staff on a number of projects. Second, LEI has extensive experience auditing electric utilities. We are familiar with the Midcontinent Independent System Operator ("MISO") region. We have extensive experience working for regulators across the United States.

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,

Marie N. Fagan, PhD
Chief Economist
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Proposal responding to RFP 23-14 to serve as independent technical consultant to Commission’s audit for Southwestern Electric Power Company Federal Environmental Adjustment Clause filings for the period of January 2020 through December 2022 (Docket No. X-TBD)



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

May 2, 2023

London Economics International LLC (“LEI”) is pleased to submit this proposal to the Louisiana Public Service Commission (“LPSC” or “the Commission”) to serve as the outside independent technical consultant in the matter of Docket No. X-TBD, “Audit of Federal Environmental Adjustment Clause Filings for Southwestern Electric Power Company (“SWEPCO”) for the Period of January 2020 through December 2022.”

LEI is a leading energy consulting firm that has advised regulators and utilities on tariffs, ratemaking, and renewable energy. The firm possesses over 20 years of experience advising regulators, electric and natural gas utilities, private firms, and specific customer classes across the United States and Canada as well as among international jurisdictions. LEI has worked with regulators on many occasions and has experience testifying on a variety of issues.

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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 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).

Figure 1. Selected LEI clients throughout the world



The following attributes make LEI unique:

- *clear, readable deliverables* grounded in substantial topical and quantitative evidence;
- *extensive experience with management auditing* enables LEI to provide benchmarking and comparison to industry best practices;
- *wealth of knowledge of energy and infrastructure regulation* worldwide enables LEI to provide expert testimony services on regulatory best practices and innovation;
- *balance of private sector and governmental clients* enables LEI to advise both regarding the impact of regulatory initiatives on private investment and the extent of possible regulatory responses to individual firm actions;
- *US-wide and worldwide experience* backed by multilingual and multicultural staff.

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 conducting management and compliance audits; the firm has broad experience in regulatory economics and cost allocation, including analytical and audit capabilities. 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 in previous engagements. The firm has experience providing testimony to state commissions on issues including utility audits, regulatory economics, cost allocation, market power, retail competition, and other issues.

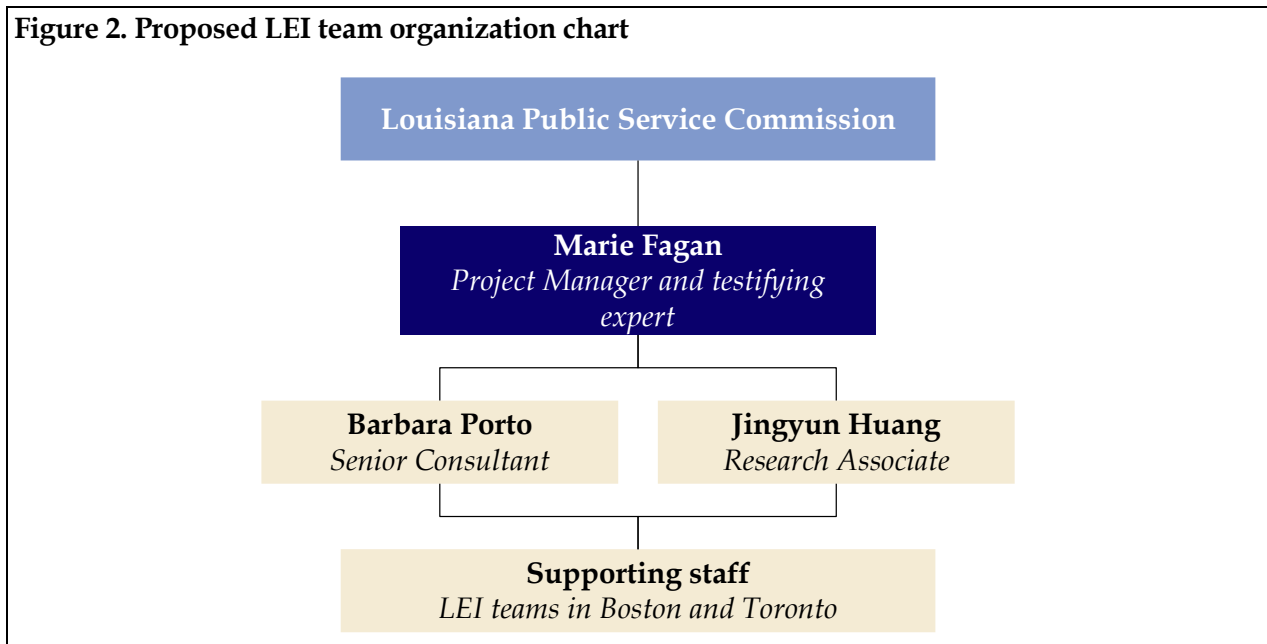
Based on the requirements of the engagement, LEI has gathered a select team of professionals with the required qualifications to assist the LPSC. The team possesses considerable independent assessment expertise, analytical and technical capabilities, experience auditing environmental compliance, and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

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 Huang, Research Associate*

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

Figure 2. Proposed LEI team organization chart



1.2 Brief bios of key staff assigned to the project

Marie Fagan, Chief Economist at LEI, will serve as the **project manager** for this engagement, and **expert witness**. With over 30 years of experience in research and consulting for the energy sector, Marie's career has spanned international upstream and downstream oil and gas, global coal, as well as North American gas and power markets. She has advised C-suite industry clients, buy-side and sell-side financial clients, as well as legislators and regulators. For state agencies, she has served as an expert witness and managed lengthy, high-profile projects. She also served as the Project Manager and lead expert in the ELL FAC audit for 2016 to 2019 (Docket No. X-35523), the Cleco FAC audit for 2018 and 2019 (Docket No. X-35522), the Audit of Cleco's Storm Cost (Docket No. X-35990), and several other projects 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 been a key member of LEI auditing teams, examining utilities' operations, staffing, plant performance, and power market participation. She has experience in coordination and execution of utility management/performance auditing and served as core team member for many of LEI utility audits, including for the Cleco FAC audit for 2018 and 2019 (Docket No. X-35522) and the ELL FAC audit for 2016 to 2019 (Docket No. X-35523).

Jingyun Huang is a Research Associate at LEI. Jingyun's experience and subject matter expertise comprises power market design, tariff design, renewable energy project evaluation, power market modeling, and market analysis. She has served as an analyst for LEI utility audit projects.

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

LPSC is seeking audit services to investigate SWEPCO’s monthly Federal Environmental Adjustment Clause (“FEAC”) filings and calculations, identify any irregularities, including but not limited to, incorrect assessment of calculations and recovery of unauthorized expenses via the FEAC by SWEPCO, and applied to Louisiana consumer billings. The audit includes a review of SWEPCO FEAC filings for the three-year period spanning January 1, 2020, through December 31, 2022. As outlined below, LEI is familiar with accounting standards and practices as well as environmental regulations for utilities and has experience analyzing the cost methodologies utilized by public service and/or utility commissions. LEI is also familiar with relevant LPSC General Orders, in particular, the FEAC Order, as described below.

2.1.1 Overview of the SWEPCO system

SWEPCO is part of American Electric Power company’s vertically integrated utilities segment. The company owns 5,298 MW of coal and gas generation capacity and 1,484 MW of wind (see Figure 3 below). SWEPCO’s retail electric rates and business practices are regulated by the LPSC, and reviews may result in refunds to customers. SWEPCO’s business practices are also regulated by the Federal Energy Regulatory Commission (“FERC”), and the wholesale rates of SWEPCO are subject to FERC’s approval. In addition, SWEPCO owns 4,078 miles of transmission lines and 26,230 miles of distribution lines. SWEPCO serves 233,800 customers in Louisiana, 189,100 customers in Texas and 124,800 customers in Arkansas (547,800 customers in total).¹

Figure 3. Generating units of SWEPCO

Generating station	Location (state)	Capacity (MW)	Fuel type	Cleco Ownership
Flint Creek	AR	516	Coal	50%
Mattison	AR	310	Natural gas	91%
Turk	AR	650	Coal	73%
Arsenal Hill/Stall	LA	621	Natural gas	100%
Lieberman	LA	217	Natural gas	100%
Pirkey	TX	675	Lignite	86%
Knox Lee	TX	344	Natural gas	98%
Wilkes	TX	889	Natural gas	98%
Welsh	TX	1053	Coal	100%
Sundance	OK	199	Wind	55%
Maverick	OK	287	Wind	54%
Traverse	OK	998	Wind	55%

Source: SWEPCO Fact Sheet. <https://www.swepco.com/lib/docs/company/about/2022FactSheet_SWEPCO.pdf>

¹ SWEPCO. “About us.” <<https://www.swepco.com/company/about/>>

2.1.2 The Federal Environment Adjustment Clause²

The Louisiana Public Service Commission issued a General Order dated July 21, 2009 in Docket R-29380, Subdocket A, establishing an Environmental Adjustment Clause (“EAC”) through which utilities are allowed to recover prudently incurred costs associated with the purchase and sale of air emission credits to meet Clean Air Act Amendments and the Clean Air Interstate Rule (“CAIR”)³. This Commission General Order also made the following findings in conjunction with the promulgation of the rule:

- i. The recovery of all environmental costs added to the cost of energy exchanged among affiliated utilities pursuant to a FERC-regulated tariff, where those costs were incurred prior to the adoption of this rule, will be governed as to all LPSC-jurisdictional utilities by the Commission’s Order No. U-25116 (dated December 4, 2008).
- ii. The costs of any credits added to the costs of energy purchased and sold between regulated affiliates that are governed by a FERC-approved tariff will be recovered by all LPSC-jurisdictional utilities in the manner specified in the Commission’s Order No. U-25116 (dated December 4, 2008) and will not be recovered through the EAC.
- iii. Only those costs associated with pollutants regulated by the US Environmental Protection Agency (“EPA”) at the time of Commission promulgation are eligible for cost recovery under the EAC. Utilities will be required to make a specific request before any other environmental costs for new pollutants regulated under the Clean Air Act, or any other federal legislation, can be recovered under the EAC. This would include those pollutants that are subject to current policy debates including greenhouse gas (“GHG”) emissions. The Commission will open a separate proceeding if carbon regulation is passed by Congress and imposed upon Louisiana jurisdictional utilities.
- iv. The Commission will conduct an audit at the end of the first year of the EAC to ensure that the mechanism is working properly and no unanticipated consequences have arisen. Audits will occur on a biennial basis thereafter.

2.1.3 Environmental regulations applicable to utilities

2.1.3.1 Clean Air Act⁴

The Clean Air Act (“CAA”), established in 1970, and then amended in 1977 and 1990, is a US federal law designed to protect human health and the environment from the effects of air

² Louisiana Public Service Commission General Order No. R-29380 Subdocket A.

³ In 2011, the US Environmental Protection Agency finalized the Cross-State Air Pollution Rule (“CSAPR”) and replaced the 2005 Clean Air Interstate Rule (“CAIR”).

⁴ Clean Air Act Requirements and History. <https://www.epa.gov/clean-air-act-overview/clean-air-act-requirements-and-history>

pollution. To protect public health and welfare nationwide, the CAA required EPA to establish national ambient air quality standards for certain common and widespread pollutants based on the latest science. States are required to adopt enforceable plans to achieve and maintain air quality meeting the air quality standards. State plans also must control emissions that drift across state lines and harm air quality in downwind states. Other key provisions are designed to minimize pollution from growing numbers of motor vehicles, and from new or expanded industrial plants. The law calls for new stationary sources (e.g., power plants and factories) to use the best available technology and allows less stringent standards for existing sources.

2.1.3.2 Clean Air Interstate Rule and Cross-State Air Pollution Rule⁵

On March 10, 2005, EPA enacted the Clean Air Interstate Rule (“CAIR”), through which it intended to reduce emissions of nitrogen oxide (“NO_x”), and sulfur dioxide (“SO₂”) that create ground-level ozone and particulate environmental problems in downwind states, including Louisiana. In March 2006, the LPSC initiated Rulemaking Docket No. R-23980, to provide specific recommendations to the Louisiana Department of Environmental Quality (“LDEQ”) for consideration in developing a state implementation plan (“SIP”) for CAIR. LPSC Special Order No. 46-2006, containing specific recommendations from LDEQ was issued October 11, 2006.

During the pendency of Rulemaking Docket R-29380 Subdocket A, the US Court of Appeals for the DC Circuit struck down CAIR and remanded it to the EPA to promulgate a new rule. Pending the adoption of a replacement rule, CAIR remained in place and utilities were required to continue complying with CAIR. On August 8, 2011, the EPA promulgated the Cross-State Air Pollution Rule (“CSAPR”) in response to the DC Circuit’s ruling. CSAPR removed requirements for Louisiana utilities to meet certain limits for ozone season NO_x. Louisiana joined multiple other parties challenging CSAPR and successfully had the rule stayed pending judicial review, keeping the requirements for CAIR in place. After three years of litigation over CSAPR, it was upheld by the US Supreme Court in 2014. On May 1, 2015, the stay was lifted and Louisiana utilities were required to begin complying with CSAPR’s requirements for ozone season NO_x emissions.

A CSAPR Update rule became final on September 7, 2016, and went into effect beginning with the May 1, 2017, to September 30, 2017, ozone season. The CSAPR Update did not replace CSAPR, it only required additional reductions in NO_x emissions from utilities in twenty-two states, including Louisiana, during the ozone season.⁶

2.1.3.3 Clean Air Mercury Rule and Mercury and Air Toxics Standards

On March 15, 2005, the US EPA issued the Clean Air Mercury Rule (“CAMR”) that required significant mercury emission reductions for coal-burning power plants. These emission

⁵ Louisiana Public Service Commission General Order No. R-29380 Subdocket A Amendment (Decided at the Commission’s July 22, 2015 Business and Executive Session)

⁶ States that are affected by the CSAPR. <https://www.epa.gov/csapr/states-are-affected-cross-state-air-pollution-rule-csapr>

reductions were required in two phases: 2009 and 2015 for NO_x; 2010 and 2015 for SO₂; and 2010 and 2018 for mercury. After the promulgation of CAIR and CAMR, a series of legal challenges to those rules resulted in their replacement. CAMR was replaced with the Mercury and Air Toxics Standards (“MATS”) rule which was established by EPA in May 2011. MATS was the first national standard to reduce mercury and other toxic air pollution from coal- and oil-fired power plants. According to the EPA’s projections, these rules save upward of 17,000 lives per year in the United States.⁷

2.1.3.4 National Ambient Air Quality Standards

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (“NAAQS”) for six common air pollutants (also known as “criteria air pollutants”).⁸ These sections require the EPA to (1) list widespread air pollutants that reasonably may be expected to endanger public health or welfare; (2) issue air quality criteria for them that assess the latest available scientific information on nature and effects of ambient exposure to them; (3) set primary NAAQS to protect human health with adequate margin of safety and (4) set secondary NAAQS to protect against welfare effects (e.g., effects on vegetation, ecosystems, visibility, climate, manmade materials, etc.); and (5) periodically review and revise, as appropriate, the criteria and NAAQS for a given listed pollutant or class of pollutants.⁹

NAAQS’s six primary pollutants include carbon monoxide, lead, NO_x, ozone, particle pollution, and SO₂. These pollutants are found all over the United States, and are detrimental to the human health and environment. Ground-level ozone, the primary component of smog, is formed when NO_x reacts with volatile organic compounds (“VOCs”) in sunlight. The EPA has identified natural and anthropogenic sources of ozone precursors (e.g., NO_x and VOCs) and ozone, including factories, lightning, power plants, vegetation, vehicles, volatile chemical products (e.g., paints and solvents), and wildfires. NO_x contributes to the formation of ozone in the atmosphere including regional ambient air non-attainment areas. Particle pollution largely consists of particulate matter (“PM”), a typical source of fine PM is PM_{2.5}, which is measured at 2.5 micrometers or less in diameter, includes direct emissions from vehicles, smokestacks, and fires. PM_{2.5} contains a great portion of secondary particles.¹⁰

2.1.3.5 General environmental air regulations in Louisiana

Under the federal CAA, SIPs must be developed by each state that has areas that are designated as nonattainment. A SIP is a plan describing how it will attain and maintain NAAQS. Included in the SIP requirements are established systems to monitor, compile, and analyze data on air

⁷ Vox. The EPA wants to make it harder to ratchet down toxic chemicals from power plants. <https://www.vox.com/2018/12/28/18159509/mats-mercury-epa-toxic-coal-power-plant>

⁸ Criteria Air Pollutants. <https://www.epa.gov/criteria-air-pollutants>

⁹ Air Quality Criteria for LEAD (Final Report, 2006) <https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=158823>

¹⁰ Ozone and Particulate Matter Air Standards: EPA Review

quality. Each SIP must be approved by the EPA, and the public is given opportunity to participate in the SIP review and approval.¹¹

Louisiana's air program is shaped by its SIP, which sets forth basic rules and strategies for implementation, maintenance, and enforcement of the NAAQS. As mandated by the federal CAA, Louisiana adopted and submitted regulations to the EPA for approval and incorporation into the SIP. The Louisiana SIP was officially submitted to EPA in January 1972 and is frequently amended to comply with the 1990 CAA amendments. The SIP focuses on permitting, emissions standards, nonattainment areas, hazardous air pollutants, and numerous other air-related requirements.¹²

The LDEQ's Office of Environmental Assessment, Environmental Services, and Environmental Compliance is responsible for administering and enforcing Louisiana's air regulations.

2.1.4 Familiarity with LPSC General Orders

In addition to LPSC Special Order No. 46-2006 noted previously, LEI is familiar with the following General Orders:

1) The Commission's General Order dated July 21, 2009 ("FEAC Order") providing electric utilities an EAC to recover from customers certain costs of environmental compliance.

As mentioned in the Section 2.1.2, the FEAC Order in Docket No. R-29380 Sub-docket A provides electric utilities with a cost recovery mechanism for the purchase and sale of air emission credits needed to meet local, state, and federal environmental regulations, including the purchase or sale of air emission credits needed to comply with CAAA of 1990 as well as CAIR¹³ and its successor, CSAPR. Variable emission mitigation costs are also eligible for recovery, as the costs represent the costs of reagents such as ammonia and limestone that are a part of the fuel mix used to reduce air emissions, among other things.¹⁴ The Order explained the rationale behind the expenses incurred by companies in compliance with environmental regulations.

The FEAC Order requires Commission Staff to audit a utility's FEAC filings on a periodic basis. The audit purpose is largely to determine (1) whether the costs passed through the Company's FEAC were prudent; (2) whether the costs were appropriate and eligible for recovery through the FEAC consistent with the Commission General Order dated July 21, 2009; (3) whether the costs passed through the Company's FEAC produced just and reasonable rates; and (4) whether the

¹¹ Louisiana SIP Revisions. <https://www.deq.louisiana.gov/page/louisiana-sip-revisions>

¹² Louisiana Environment-General <https://www.blr.com/Environmental/EHS-Management/Environment-General-in-Louisiana>

¹³ Louisiana Public Service Commission RFP 20-03 Docket No. X-35507

¹⁴ SEC Litigation, Other Commitments and Contingencies, and Disclosures about Guarantee. <https://www.sec.gov/Archives/edgar/data/1089819/000119312517087404/R24.htm>

costs passed through the FEAC were necessary for the provision of electric service to Louisiana ratepayers.¹⁵

2) *The Commission's General Order dated March 12, 1974 prohibiting "promotional practices" by public utilities.*

The General Order prohibits a public utility from giving a preference to someone for the purpose of enticing them to deal with that utility in preference to other public utilities. It is LEI's understanding that this does not apply if the action is a part of a comprehensive service policy which is applied uniformly.¹⁶

3) *The Commission's General Order dated October 1, 1997 (Docket No. U-21497) regarding the development of standards governing the treatment and allocation of fuel costs by electric utility companies.*

The General Order allows utilities to pass on to its customers substantially the cost of fuel used for electric generation and the cost of power purchased for utility customers. Recovery of Fuel Adjustment Clause ("FAC") costs is subject to periodic fuel audits by the LPSC. The Order provides that an audit of FAC fillings is to be performed at least every other year.¹⁷

2.2 Selected experience

The combination of the LEI team's management and compliance auditing expertise, experience in regulatory economics and cost allocation, as well as familiarity with the MISO context means that LEI is uniquely qualified to provide the services in this RFP.

This section provides projects relevant to the proposed engagement. The projects listed here are indicative of LEI's expertise and are not an exhaustive record of experience.

2.2.1 Management/performance auditing experience

LEI has performed management review and auditing services around the world, including assessment of utilities' practices, review of fuel cost mechanisms, examining compliance with regulations, and investigation of the performance of generating assets. Projects have included:

- ***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 compliance with the Fuel Adjustment Clause ("FAC") for Entergy Louisiana and Cleco Power. Each audit involved 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

¹⁵ Louisiana Public Service Commission Docket No. U-33971

¹⁶ <https://law.justia.com/cases/louisiana/supreme-court/1983/83-ca-1196-1.html>

¹⁷ SEC Litigation, Other Commitments and Contingencies, and Disclosures about Guarantee. <https://www.sec.gov/Archives/edgar/data/1089819/000119312517087404/R24.htm>

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.

- **Louisiana PSC 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.
- **Management audit of fuel, variable cost, and capital expenditures:** LEI was engaged by the Public Utility Commission of Ohio ("PUCO") to perform an audit of a PPA rider of the Ohio Power Company (AEP Ohio) for the output of two coal plants operated by Ohio Valley Energy Company ("OVEC"). LEI examined fuel and variable cost expenditures, and capital expenditures to determine whether they were prudently incurred. LEI also examined environmental compliance activities as they related to fuel purchases. LEI compared and benchmarked AEP Ohio costs and other operational results against data from public sources. LEI also examined and benchmarked power plant performance. LEI performed similar audits for PUC related to Duke Energy Ohio and AES Ohio's riders related to OVEC.
- **Mississippi fuel and energy management audit:** LEI was engaged by the Mississippi Public Service Commission to audit the management activities of a major vertically integrated utility in the MISO region for two consecutive years. LEI assessed the utility's practices for bidding generation into the MISO wholesale markets, and for economical purchase and use of fuel and electric energy. LEI assessed 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. Following the completion of the two-year audit cycle, the Commission engaged LEI to audit the other large vertically integrated utility in Mississippi.
- **Assessment of fuel cost pass through mechanisms:** LEI was retained by the Hong Kong Special Administrative Region government to assess its electricity regulatory regime, to help the Government prepare for negotiations with the utilities. LEI examined cost of capital, ratebase calculations, efficiency incentives, and fuel cost pass through mechanisms.
- **Ohio RECs and SRECs audit:** LEI was engaged 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.

2.2.2 MISO region experience

LEI closely monitors the MISO market for on-going client work. LEI also releases 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 is a solid foundation in this management review. Projects have included:

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- ***Asset evaluation:*** LEI was engaged by an investment firm in association with asset valuation, due diligence support and market analysis. Work involved reviewing documents in a virtual data room, and analysis related to drivers of gross margin for the asset: macroeconomics, weather fluctuations, fuel and electricity cost projections, and overview of gas and electricity market in the MISO region where the asset was located.
- ***Long-term market outlook for MISO:*** LEI was hired by a private utility to perform an independent market analysis for a number of assets located in NYISO, MISO, CAISO, and ERCOT. LEI conducted a 20-year price forecasting horizon and provided forecasts of plants' output, load factor, and realized prices.
- ***Congestion analysis for parts of MISO:*** LEI was retained by a private client to analyze the congestion within the Chicago area and MISO zones surrounding Lake Michigan.
- ***Due diligence analysis:*** LEI was engaged by a private client to provide analytical support on their due diligence process. The supporting tasks entailed: providing an updated outlook on energy prices and intelligence on recent developments in PJM and MISO; conducting REC price forecasts; and reviewing requirements and risk exposure for hydropower facilities in capacity markets.
- ***Revenue opportunity for gas-fired cogeneration units in MISO:*** The purpose of the assignment was to inform the client of potential revenue risks associated with the plants upon termination of their power purchase agreements. LEI simulated MISO's energy and capacity markets and derived forecast of wholesale energy prices and capacity prices relevant to the units' geographic location.
- ***Economic analysis for a proposed transmission project in MISO:*** LEI conducted a modeling exercise to determine the potential revenues for a proposed transmission project wheeling power from western MISO to eastern MISO (and eventually PJM). LEI evaluated both the revenue opportunities to the investors as well as social benefits to the MISO system; and evaluated the incremental value of the business strategy of selling the energy (and capacity) out of East MISO to third parties in PJM.
- ***Costs/benefits analysis of Entergy joining MISO or SPP:*** LEI was hired by the Public Utility Commission of Texas ("PUCT") to provide a cost benefit analysis pertaining to an announced 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 versus SPP.
- ***Review of ETI's impact analysis of termination of PPA on consumers:*** LEI was hired by the PUCT to conduct a due diligence review of the analyses performed by ETI on the impact of termination of certain PPAs while a member of MISO. LEI's scope of work included a review of ETI's inputs and 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 located in the Midwest region of the US to determine their potential value upon expiration of ongoing PPA. The plants revenues were calculated based on the 25-year forecasts of electricity prices in their respective zones. Given the long-term horizon of the modeling exercise, we also simulated an organized capacity

market based on the Resource Adequacy requirements of MISO to estimate potential capacity revenues for the plants.

2.2.3 Expert witness experience

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

- ***Montana-Dakota Utilities (“MDU”) rate case:*** LEI was engaged by the North Dakota Public Service Commission (“NDPSC”) 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 investment, the proposed return on equity, the common equity ratio, and the impact of amortization of early retirement of coal plants. LEI prepared data requests and provided written reports and oral testimony. [NDPSC Case No. PU-22-194].
- ***Independent expert related to Maine Energy Cost Reduction Act:*** LEI was engaged by the State of Maine Public Utilities Commission to assist in evaluating options for expansion of natural gas supply into Maine (with a view to reducing the cost of gas and power to Maine customers). LEI reviewed and evaluated proposals for firm natural gas transportation service by pipeline developers. These evaluations included LEI’s review of commercial terms include in the pipeline Precedent Agreements that underpin capacity expansion projects; review of contract provisions for Firm Transportation Agreements and Negotiated Rate Agreements; and evaluation of the status of the FERC and state-level permitting process for each pipeline proposal. The project also included natural gas network modeling (using GPCM, an industry-standard network model of the North American natural gas system) and power simulation modeling (using LEI's proprietary POOLMod model) to arrive at a quantitative cost-benefit analysis of proposals. LEI 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 expert witness in the proceedings. (2016) [MPUC Docket No. 2014-00071]
- ***Cost of capital for regulated generating assets:*** LEI provided expert testimony to the Ontario Energy Board regarding risk factors associated with Ontario Power Generation’s prescribed assets, as well as creating a risk-return continuum on which power sector assets could be placed. [OEB, proceeding ID: EB-2007-0905]
- ***Advisor to Maine Public Utilities Commission on transmission cost allocation:*** LEI advised Maine Public Utilities Commission on methodologies for transmission cost allocation by comparing and contrasting alternative planning approaches and pricing models employed within the US and one international jurisdiction, the United Kingdom. The final report provided a ‘strawman’ recommendation for an effective cost allocation methodology. (2010) [Docket No. RM10-23-000]
- ***Independent expert assessing role of Enbridge Line 3 for Minnesota:*** LEI was engaged as the independent market expert assisting the Minnesota Department of Commerce in evaluating the application of Enbridge Energy for a Certificate of Need for its Line 3 oil pipeline expansion project. LEI provided written testimony, responded to interrogatory requests, and

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provided written surrebuttal and oral testimony. [Docket No. PL-9/CN-14-916, OAH Docket No. 65-2500-32764]

- ***Preparation of analysis of generation market power under FERC's indicative screens for market-based rate authorization:*** In support of the acquisition of a 21-megawatt ("MW") photovoltaic solar facility, LEI performed an updated market power analysis for acquirer's affiliates in the California ISO which have been granted market-based rate authorization, and prepared the related Section 203 filing. (2010) [ER10-204-000]
- ***Triennial market power analysis (southeast region):*** In support of a client's application to renew market-based rate authorization under the jurisdiction of FERC, LEI performed Pivotal Suppliers Analysis and Market Share Analysis for the Entergy balancing authority area. (2011) [ER97-4281 et al.]

3 Proposed plan of action

The scope of work encompasses analysis of purchase and sale of air emission credits included in the FEAC, by SWEPCO. LEI's audit procedures, as outlined by the FEAC Order, will include:

- A review and analysis of the utility's monthly EAC reporting requirements filed with the Commission;
- A review and analysis of the utility's monthly comprehensive environmental adjustment filings to assure compliance with all pertinent state and federal regulations; and
- Specific findings and recommendations concerning whether the costs passed through the adjustment clause were or were not reasonable and prudent, and whether the costs were appropriate for recovery in the EAC mechanism and consistent with this Rule.

Based on LEI's previous experience working on audits and the RFP's scope of representation, LEI proposes seven Tasks to structure this engagement, with a number of subtasks: four Tasks would be executed concurrently and the remaining Tasks 5 through 7 would be executed sequentially (see Figure 4). LEI's plan of action is discussed in detail below. This plan can be viewed as a starting point, as LEI understands that the LPSC and its Staff will have the right to determine how the tasks will be carried out.

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

LEI will work with the Commission staff to ensure that LEI has access to the necessary resources from SWEPCO (contact persons, documents, records, and so on) that will enable the conduct of the audit. If appropriate, LEI will utilize LPSC's data request procedures for issuing information requests and recoding response, which will assist in gathering information and organizing materials.

Figure 4. Major audit tasks and subtasks /activities (proposed)

Tasks 1-4 will be performed concurrently	Task 1: Review the Company's FEAC filings and the related supporting documentation
	Sub-task/activity
	Define criteria upon which process and results will be evaluated
	Define data needs, issue DRs, conduct meetings, conference calls
	Systematically review the Company's FEAC filings
	Develop LEI's recommendations
	Task 2: Review accompanying workpapers and the Company's financial data
	Sub-task/activity
	Define criteria upon which process and results will be evaluated
	Define data needs, issue DRs, conduct meetings, conference calls
	Identify irregularities and assess calculations
	Develop LEI's recommendations
	Task 3: Review the Company's purchase and sale practices for allowances and other environmental costs
	Sub-task/activity
	Define criteria upon which process and results will be evaluated
	Define data needs, issue DRs, conduct meetings, conference calls
Perform analytics in terms of the environmental costs and revenues	
Develop LEI's recommendations	
Task 4: Review historical data involving prior audits	
Sub-task/activity	
Define criteria upon which process and results will be evaluated	
Define data needs, issue DRs, conduct meetings, conference calls	
Review any compliance requirements included within Orders resolving prior audits	
Develop LEI's recommendations	
Tasks 5-7 will be performed sequentially	Task 5: Provide draft audit report/audit memorandum and/or pre-filed testimony
	Sub-task/activity
	Prepare draft report/audit memorandum and/or pre-filed testimony
	Present draft report and gather comments
	Task 6: Provide final audit report and working papers
	Sub-task/activity
	Finalize report and deliver working papers
Task 7: Provide testifying expert	
Sub-task/activity	
Attend hearings	

3.1 LEI's approach to the FEAC filings audit

LEI's audit will make use of the following:

- **Qualitative assessments of processes** based on the information gathered during documentation review and interview processes, as well as the professional experience of our consulting team and the pragmatic implications of the methods;
- **Quantitative assessments of results** focusing on various compliance and cost trends and management's ability to control and calculate them; and
- **Comparative analysis of results** performed using the Company's environmental costs and revenues during the review period and prior to the review period to determine any significant changes or irregularities in pricing or utilization throughout the audit period.

For each of the tasks presented in Figure 4 shown previously, LEI's audit approach will be to:

1. **Define criteria** upon which processes and results will be evaluated;

2. **Describe the Company's process**, both qualitatively and, if possible, quantitatively, based on the results of data requests and interviews;
3. **Examine and evaluate the Company's results** both qualitatively and, if possible, quantitatively; and
4. **Provide LEI's recommendations.**

3.1.1 Define criteria upon which processes and results will be evaluated

LEI will develop criteria which will frame LEI's evaluation of the Company's processes and results. The following is a sample of audit criteria; not every criterion will apply to every audit area:

- Are the environmental expenses incurred properly allocated?
- Is there analytic rigor, oversight and management attention, and documentation of cost allocation?
- Has the Company appropriately responded to environmental regulations relevant to the plants? Has this impacted fuel procurement, in terms of type and cost of fuel purchased?
- Has the Company ensured a rigorous emission allowance management strategy? What methods does the Company use to analyze environmental compliance options and strategies?
- Has the Company implemented changes that may have been recommended in previous audits?

3.1.2 Describe the Company's processes

LEI will expect the Company to provide concrete examples of each relevant process (e.g. purchase and sale practices for allowances). This information may come from interviews, conference calls, and data requests.

3.1.3 Provide LEI's conclusions and recommendations

LEI will bring to bear its audit expertise and broad experience in the power sector, to frame practical suggestions for improvements, if any are warranted.

3.2 Detailed work plan

3.2.1 Task 1: Review the Company's FEAC filings and the related supporting documentation

Using the Criteria-Process-Results approach, LEI will review the Company's FEAC filings, draft data requests and review responses thereto to assess whether accounting procedures accurately and properly allocate revenues and costs in accordance with FEAC requirements.

3.2.2 Task 2: Review accompanying workpapers and the Company's financial data

Using the Criteria-Process-Results approach, LEI will investigate the workpaper of the FEAC filings of the Company and assess the financial data. To evaluate the reasonableness of the

calculations and cost recovery, the investigation will include a comparison between the audit period and prior periods, to provide context. LEI will also interview company personnel to obtain an understanding of processes, if needed. LEI will trace accounts to supporting documentation and re-perform calculations to verify mathematical accuracy.

3.2.3 Task 3: Review the Company's purchase and sale practices for allowances and other environmental costs

Using the Criteria-Process-Results approach, LEI will examine the Company's environmental compliance practices, including but not limited to, the involvement of the utility's parent company and/or affiliates if relevant. LEI will review the Company's accounting for costs and revenues associated with the purchase and sale of air emission credits needed to meet regulatory requirements.

3.2.4 Task 4: Review historical data involving prior audits

LEI will use the Criteria-Process-Results approach to review the Company's historical data involving prior audits, including any compliance requirements with Orders resolving prior audits. LEI will perform analytics comparing the data in this audit period against that of prior periods to determine any significant changes or abnormalities.

3.2.5 Task 5: Provide draft audit report/audit memorandum and/or pre-filed testimony

LEI will draft the audit report based on the information gathered from meetings, interviews, and field trips (if any), and provide LEI's conclusions and recommendations in Tasks 1 through 4. LEI's report will be as concise as possible and will identify issues clearly, to provide the Commission staff with the information it requires.

The draft report will provide an overview of the audit, will summarize how the audit process was conducted, what the findings were, and the conclusions and recommendations for corrective actions, if any. The report will also discuss the supporting evidence and references provided to the team. The draft report will include the following information:

- Executive summary and recommendations;
- Introduction to the FEAC filings audit;
- Scope, objectives, and methodology of audit;
- Documents reviewed, and people interviewed during the audit;
- Evaluation of management processes and decisions in the context of the time such decisions were made;
- Findings and conclusions which are clearly supported in the audit report;
- Identification of issues which require more explanation or examination; and
- Recommendations for corrective actions if applicable.

LEI will send the draft to the Commission for feedback and comment; and to the Company for verification of factual statements and indication of confidential information which will need to be redacted for a public version (if required by the Commission Staff).

3.2.6 Task 6: Provide final audit report and working papers

LEI will finalize the audit report based on the feedback received from the Commission and the Company. LEI will prepare a “confidential” and a “redacted” version of the report.

The final report will include an executive summary of the audit, findings, and if applicable recommendations for corrective actions.

LEI will submit reports in the quantity and format requested by the Commission Staff.

3.2.7 Task 7: Provide testifying expert

LEI expects to present expert testimony during a hearing(s) involving the FEAC filings audit report. Marie Fagan will serve as the testifying expert for this engagement.

3.3 Audit deliverables and schedule

The team expects that the engagement will start with a **kick-off meeting** that will be held over the phone, with the Commission Staff. During this meeting, the team 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 “Business and Executive Session.” As such, LEI proposes the kick-off meeting to be held on about June 5, 2023.

LEI understands that timeline for scope of representation for the audit is 18 months. However, the audit is of a fairly narrow scope, and if the Commission Staff wishes LEI to complete the work in a shorter time scale, LEI can do so.

Assuming for the present the 18-month scope of representation, and given a start date of **June 5, 2023**, LEI commits to the following deliverables and target dates (see Figure 5):

- **Written progress report** (August 25, 2023, or date agreed-upon with the Commission staff)
- **Draft report** (October 27, 2023)
- **Final report** (December 8, 2023)
- **Complete set of working papers** (December 22, 2023)
- **Testimony** (date TBD)

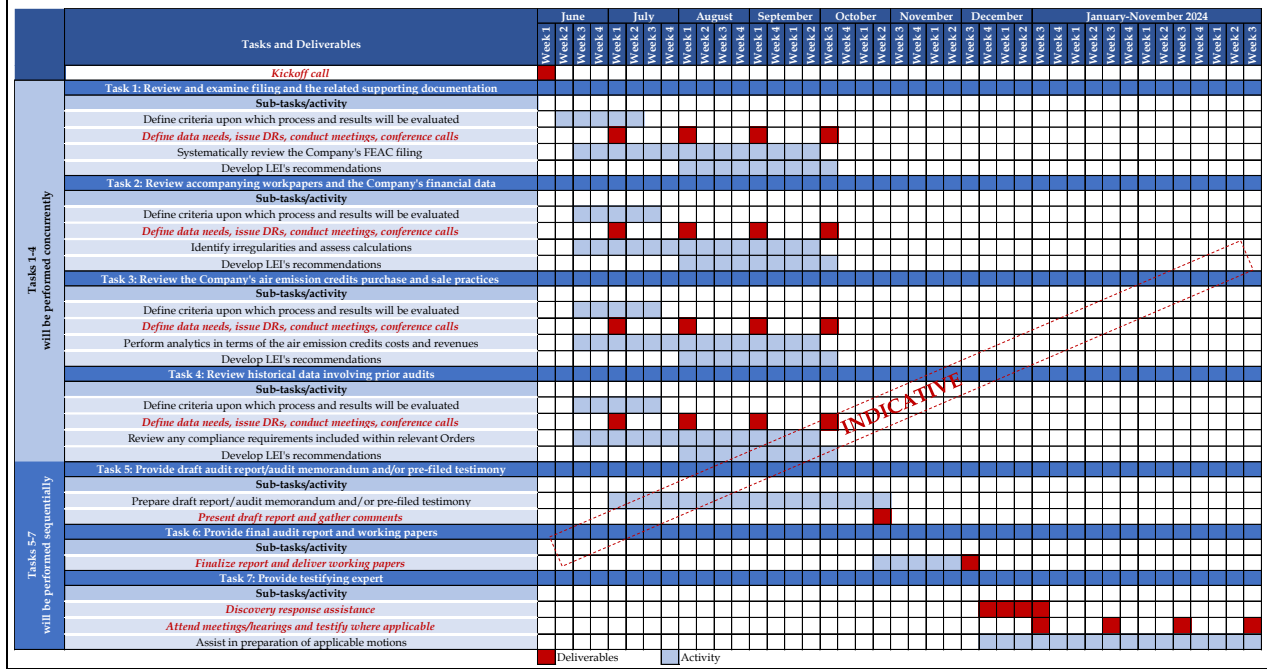
LEI will also provide **weekly** updates to the Commission staff. As noted previously, LEI will summarize progress made on required audit activities and preliminary findings.

LEI expects frequent contact with the Commission staff in the initial stages of the project, when main activities will include gathering data from the Company and setting up meetings and calls with the personnel of the Company.

LEI proposes submitting a written progress report at the approximate calendar mid-point of Tasks 1-5 of the audit, which is approximately **August 25, 2023**. The specific due date of the interim written progress report will be discussed and agreed upon with the Commission Staff at the kick-off meeting.

LEI commits to having the appropriate experts available throughout the project from June 2023 through November 2024. LEI's team will have a Project Manager for this engagement, Marie Fagan, who will liaise with the Commission Staff throughout the project.

Figure 5. Indicative work schedule and timing of deliverables, assuming 18-month scope and June 5, 2023 start date



4 Timeline and budget

LEI expects to have a kick-off meeting a few weeks after the signing of the contract. LEI would take advantage of this time to gather data and information needed to begin Task 1.

4.1 Timeline

As indicated in the RFP, the time period allowed for the matter is 18 months. LEI expects that the schedule and the deadlines will be finalized during the kick-off meeting, or shortly before or after, as noted in section 3.3. LEI commits to having the key staff members noted in Section 1.2 available for the entire period of the project.

4.2 Professional fee budget

LEI offers a total professional fee budget not to exceed **\$35,905** (see Figure 6).

Figure 6. Professional fee budget

Task	Total LEI staff hours	Professional fee budget
Kickoff meeting	3	\$ 795
Task 1: Review and examine filing and the related supporting documentation	20	\$ 4,650
Task 2: Review accompanying workpapers and the Company's financial data	20	\$ 4,650
Task 3: Review the Company's environmental allowance purchase and sale practices	20	\$ 4,650
Task 4: Review historical data involving prior audits	18	\$ 5,085
Task 5: Provide draft audit report/audit memorandum and/or pre-filed testimony	15	\$ 3,975
Task 6: Provide final audit report and working papers	15	\$ 3,975
Task 7: Provide testifying expert	30	\$ 8,125
Total	141	\$ 35,905

For Task 7, LEI's Chief Economist, Marie Fagan, would present expert testimony at any hearing at which the audit report is considered. This would be billed at an hourly rate of \$300/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 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 / Lead 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 Figure 8 below. LEI recognizes the engagement may ultimately not involve any travel, if travel is involved, LEI will comply with all expense caps as outlined in the State of Louisiana Division of Administration Travel Policies and Procedures Memorandum. Accordingly, the indicative travel expense budget is **\$3,660**.

Figure 8. Indicative travel costs

Travel	# trips	# people	# nights	Total cost
Meetings with Commission and/or Staff	1	2	1	\$1,052
Meetings with parties	2	2	2	\$2,608
Total estimated costs				\$3,660

4.4 Total budget

The total indicative budget including professional fees, travel, and other expenses therefore amounts to **\$40,165**.

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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6.1 Marie N. Fagan, PhD



Chief Economist, London Economics International, LLC

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 the US Association for Energy Economics ("USAEE") and is a former member of the USAEE

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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:	London Economics International LLC ("LEI")
Position:	Chief Economist (2020-present) Managing Consultant and Lead Economist (2016-2019) Managing Consultant (2014-2015)

Date:	2003-2014
Location:	Cambridge, MA
Company:	IHS Markit (formerly Cambridge Energy Research Associates ("CERA"))

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Position:	<p>Senior director, Upstream Strategy Advisory service (2012-2014).</p> <ul style="list-style-type: none"> 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 <p>Senior director, North American Gas, Power, and Renewables group (2007-2011).</p> <ul style="list-style-type: none"> 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 <p>Director/Senior director, CERAVIEW Institutional Investor Service (2004-2007)</p> <ul style="list-style-type: none"> 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 <p>Director, North American Gas Advisory service (2003-2004)</p> <ul style="list-style-type: none"> 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.
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Date:	2001-2002
Location:	Boston, MA
Company:	International Human Resources Development Corporation ("IHRDC")
Position:	<p>Director, International Gas Program</p> <ul style="list-style-type: none"> 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.

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

Date:	1994-1996
Location:	Washington, DC
Company:	US Department of Energy, Energy Information Administration
Position:	<p>Economist</p> <ul style="list-style-type: none"> • 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.

Date:	1989-1994
Location:	Vienna, Virginia
Company:	Decision Analysis Corporation of Virginia (DAC)
Position:	<p>Research associate/ Associate</p> <ul style="list-style-type: none"> • 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.

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

PROJECT EXPERIENCE:

<i>Date:</i>	October 2022 - present
<i>Location:</i>	North Dakota
<i>Organization:</i>	North Dakota Public Service Commission
<i>Description:</i>	Montana-Dakota Utilities (“MDU”) 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 MDU. LEI examined key components of the rate case, which included the depreciation study, tax rates, environmental upgrades, transmission investment, the proposed return on equity, the common equity ratio, and 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].

<i>Date:</i>	July 2022 – December 2022
<i>Location:</i>	Maine
<i>Organization:</i>	Maine Public Utilities Commission
<i>Description:</i>	Investment incentives for electric distribution utility 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>	Analysis of fair market prices for natural gas 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

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

<i>Date:</i>	March 2022
<i>Location:</i>	Texas/ERCOT
<i>Organization:</i>	UT Austin Bureau of Economic Geology
<i>Description:</i>	Expert contributor to study of gas distribution industry for Texas Railroad Commission 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>	Economic impact of development of offshore wind in Maine 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>	February 2021 winter storm impacts on ERCOT natural gas production and prices

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

<i>Date:</i>	May 2021 - March 2022
<i>Location:</i>	Louisiana
<i>Organization:</i>	Louisiana Public Service Commission
<i>Description:</i>	<p>Evaluation of utility green pricing option</p> <p>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.</p>

<i>Date:</i>	April 2021 - June 2021
<i>Location:</i>	ERCOT
<i>Organization:</i>	Private client
<i>Description:</i>	<p>February 2021 winter storm impacts on ERCOT energy prices</p> <p>For a law firm representing an ERCOT market participant, LEI conducted an analysis of the impact on hourly real time energy prices in ERCOT for the week of February 14, 2021. Marie served as co-author of report, filed in PUCT Project 51812, Item No. 207. https://interchange.puc.texas.gov/search/documents/?controlNumber=51812&itemNumber=207</p>

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

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

<i>Date:</i>	August 2020 – August 2021
<i>Location:</i>	Louisiana
<i>Organization:</i>	Louisiana Public Service Commission
<i>Description:</i>	Audit of fuel adjustment clause of Entergy Louisiana 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>	Audit of fuel adjustment clause of Cleco Power

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	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 appropriateness of interest rates as applied to over-recovered or under-recovered costs; examination of the impact of deferred costs; reconciliation of expenses recorded in FERC Form 1 account categories (“as booked”) with expenses included in monthly fuel adjustment clause filings; the prudence and reasonableness of costs incurred for oil, gas, coal, and lignite; and transportation; and an assessment operating performance of utility generating assets.
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<i>Date:</i>	June 2020 – October 2020
<i>Location:</i>	Ohio
<i>Organization:</i>	Public Utilities Commission of Ohio
<i>Description:</i>	Audit of PSR of Duke Energy LEI was engaged by the Public Utility Commission of Ohio, to perform an audit of the Price Stabilization Rider (“PSR”) of Duke Energy Ohio related to Duke’s purchase of energy from the Ohio Valley Electric Corporation (“OVEC”) (PUCO Case No. 20-167-EL-RDR). Aspects of the audit included assessing the reasonableness and prudence of the disposition of energy and capacity in the PJM market of the energy provide by two coal plants, as well as plant performance, compliance with environmental requirements, and the prudence of fuel purchases. LEI also audited charges and true ups related to the company’s quarterly PSR filings. Marie supervised and directed the audit.

<i>Date:</i>	May 2020 – September 2020
<i>Location:</i>	Ohio
<i>Organization:</i>	Public Utilities Commission of Ohio
<i>Description:</i>	Audit of PPA Rider of AEP Ohio 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>	Impacts of the potential shutdown of the Dakota Access pipeline (“DAPL”) 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

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	at: https://earthjustice.org/sites/default/files/files/3154-525_declarations-in-support-of-standing-rock.pdf
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<i>Date:</i>	February 2020 – February 2022
<i>Location:</i>	Louisiana
<i>Organization:</i>	Louisiana Public Service Commission
<i>Description:</i>	Rulemaking to study renewable energy tariff, aka “green tariff” options Marie’s team supported the Louisiana Public Service Commission in Docket No. R-35423. LEI provided framing questions for stakeholder feedback on green tariff options, evaluated stakeholder responses, provided in-depth case studies of green tariffs in other US jurisdictions, and provided other consultatory services for the Commission.

<i>Date:</i>	January 2020 – June 2020
<i>Location:</i>	Massachusetts
<i>Company:</i>	Massachusetts Office of the Attorney General
<i>Description:</i>	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). Marie led the project which included examining National Grid’s projections of gas demand and its assumed resources to meet demand; examining the Assigned Precedent agreement for the FT as well as other documents; and providing a critique of the assumptions driving National Grid’s cost-benefit analysis. Marie reviewed briefs, developed interrogatory requests, and evaluated the responses to such requests.

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

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

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

<i>Date:</i>	May 2019 – August 2020
<i>Location:</i>	Massachusetts
<i>Organization:</i>	Investor-owned gas distribution utility
<i>Description:</i>	Econometric benchmarking analysis of gas utility performance for PBR 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.

<i>Date:</i>	June 2019- December 2019
<i>Location:</i>	Ontario
<i>Organization:</i>	Generating company
<i>Description:</i>	Benchmarking generation utility performance 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>	Winter fuel reliability/electric power market design 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

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

<i>Date:</i>	September 2018-December 2018
<i>Location:</i>	United States, ISO-NE
<i>Company:</i>	Maine Public Utilities Commission
<i>Description:</i>	<p>Avoided energy supply costs</p> <p>LEI was engaged to perform a critical review of the methodology and assumptions which underpinned other consultants’ analysis of avoided energy supply costs (“AESC”). Marie led the gas market forecast, and the critical review of the other consultants’ gas price forecast. She also led a careful examination of the economic theory and econometric techniques used by the other consultants to estimate demand-induced price reduction effects (“DRIPE”). Owing to miss-specified models and/or unwarranted assumptions (such as a perfectly inelastic demand curve for natural gas in the long term) the other consultants’ DRIPE estimates were generally too high. [Docket No. 2018-00321]</p>

<i>Date:</i>	June 2018-December 2018
<i>Location:</i>	United States, PJM
<i>Company:</i>	Public Utilities Commission of Ohio
<i>Description:</i>	<p>Management performance and financial audit of large utility</p> <p>LEI was engaged to perform a management performance and financial audit of AEP Ohio’s Alternative Energy Rider (“AER”). Marie led the project which required examining</p>

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

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

<i>Date:</i>	June 2017-December 2018
<i>Location:</i>	United States, MISO, Mississippi
<i>Company:</i>	Mississippi Public Service Commission
<i>Description:</i>	<p>Management audit of large vertically integrated utility</p> <p>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</p>

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	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.
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<i>Date:</i>	November 2018 – February 2019
<i>Location:</i>	WECC
<i>Company:</i>	PacifiCorp
<i>Description:</i>	Independent evaluator (“IE”) for energy procurement 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.

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

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

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

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

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

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

<i>Date:</i>	August 2016-October 2016
<i>Location:</i>	Maine

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

<i>Date:</i>	May 2016
<i>Location:</i>	ERCOT/Texas
<i>Company:</i>	Private client
<i>Description:</i>	Examination of ancillary services 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>	Due diligence in ERCOT 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>	Project manager and testifying expert 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

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	<p>underpin capacity expansion projects; review of contract provisions for Firm Transportation Agreements and Negotiated Rate Agreements; and evaluation of the status of the FERC and state-level permitting process for each pipeline proposal. Marie provided expertise in upstream natural gas (exploration and production), midstream natural gas (interstate pipelines) and global energy markets including oil and LNG markets, to provide a solid grounding for LEI's long-term outlook for New England natural gas prices. Marie directed the natural gas network modeling (using GPCM, an industry-standard network model of the North American natural gas system) and power simulation modeling (using LEI's proprietary POOLMod model) to arrive at a quantitative cost-benefit analysis of proposals. She authored reports provided to the Commission; responded to discovery from other parties; prepared discovery questions and cross-examined witnesses; reviewed testimony by other parties and provided assessments of the issues presented; and she served as an expert witness in the proceedings.</p>
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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>	<p>Due diligence for assets in ISO-NE (Maine) 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</p>

<i>Date:</i>	October 2015-November 2015
<i>Location:</i>	ERCOT/ Texas
<i>Company:</i>	Private equity company
<i>Description:</i>	<p>Due diligence for assets in ERCOT 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.</p>

<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>	<p>Examination of design of auctions 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</p>

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	rules, and international auctions for toll roads to examine whether and how duration or length of contract is incorporated into bidding.
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<i>Date:</i>	May 2015
<i>Location:</i>	Connecticut; Virginia
<i>Company:</i>	Private equity company
<i>Description:</i>	Review of gas transportation contracts Marie evaluated contracts for firm gas transportation capacity for gas-fired plants in Virginia and Connecticut.

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

<i>Date:</i>	August 2014 - January 2015
<i>Location:</i>	North America
<i>Company:</i>	Private client
<i>Description:</i>	Monthly energy market reports 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 ₂ . 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>	Assessment of ancillary service market 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>	Due diligence for asset in PJM 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.

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

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

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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

6.2 Barbara Porto

Senior Consultant, London Economics International, LLC



YEARS WITH FIRM/ENTITY: 8

NATIONALITY: BRAZILIAN

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.

Barbara has experience in coordination and execution of utility management/performance auditing and has been involved in all LEI’s utility management performance audit engagements since joining the company.

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

EDUCATION:

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

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

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

EMPLOYMENT RECORD:

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

Date:	July 2008 - August 2013
Location:	Rio de Janeiro, Brazil
Company:	ENEVA (subsidiary of E.ON AG)
Position:	Analyst (July 2010 - August 2013) Intern (July 2008 - June 2010)

RECENT PROJECT EXPERIENCE:

<i>Date:</i>	January 2019 to present
<i>Location:</i>	California
<i>Company:</i>	LEI's Continuous Modeling Initiative (CMI)
<i>Description:</i>	As lead California market modeler, Barbara tracks and evaluates the impact of on-going structural and regulatory changes in the electricity market to produce detailed price forecast and associated analyses on an ongoing semi-annual basis using LEI's in-house price forecast software, POOLMod.

<i>Date:</i>	October 2022 - ongoing
<i>Location:</i>	North Dakota
<i>Company:</i>	North Dakota Public Service Commission
<i>Description:</i>	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.

<i>Date:</i>	August - December 2022
<i>Location:</i>	Mississippi
<i>Company:</i>	Mississippi Public Service Commission
<i>Description:</i>	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

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	prepared a comprehensive report detailing its analysis, findings, and recommendations, and appeared before the Mississippi Public Service Commission to present its findings and recommendations. Barbara worked on the procurement and inventory management sections of the audit related to natural gas and coal.
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<i>Date:</i>	June 2022
<i>Location:</i>	California
<i>Company:</i>	Confidential client
<i>Description:</i>	<p>Ancillary service revenue streams for long-duration storage in California</p> <p>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.</p>

<i>Date:</i>	July 2020 – April 2022
<i>Location:</i>	Louisiana
<i>Company:</i>	Louisiana Public Service Commission
<i>Description:</i>	<p>Management audit of fuel adjustment clause for Cleco Power</p> <p>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.</p>

<i>Date:</i>	July – December 2021
<i>Location:</i>	Ohio
<i>Company:</i>	Public Utility Commission of Ohio
<i>Description:</i>	<p>Audit of Legacy Generation Resource Rider for Ohio Valley Energy Company</p> <p>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 determined whether they were prudently incurred.</p>

<i>Date:</i>	July – December 2019; July – December 2020; June – December 2021
<i>Location:</i>	USA
<i>Company:</i>	Mississippi Public Service Commission
<i>Description:</i>	<p>Management audit of fuel and electricity procurement</p> <p>LEI was engaged for a two-year term (and then extended for an additional year) 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</p>

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	present and defend findings. Barbara worked on the procurement and inventory management sections of the audit related to natural gas and coal.
<i>Date:</i>	August 2020 – September 2021
<i>Location:</i>	Louisiana
<i>Company:</i>	Louisiana Public Service Commission
<i>Description:</i>	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.
<i>Date:</i>	February – April 2021
<i>Location:</i>	ISO-NE and California
<i>Company:</i>	Confidential client
<i>Description:</i>	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.
<i>Date:</i>	August – December 2020
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	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 ARR to determine whether the current ARR/FTR processes constitute appropriate mechanism to ensure that load receives the optimal value of the transmission system for which it is paying through its transmission access charges. Barbara was responsible for analyzing the FTR/ARR metrics and target allocation process, as well as comparing it to similar mechanisms in other jurisdictions.
<i>Date:</i>	January – March 2020
<i>Location:</i>	Massachusetts
<i>Company:</i>	Massachusetts Office of the Attorney General
<i>Description:</i>	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

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	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.
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<i>Date:</i>	January – March 2020
<i>Location:</i>	USA – Midwest
<i>Company:</i>	Distribution cooperative
<i>Description:</i>	LEI was retained by a Midwest cooperative seeking to cease purchasing supply from the incumbent and rather opt for an alternate supply provider. As part of the engagement, LEI prepared a critique of the stranded cost estimate provided by the incumbent provider and calculated its own estimate of the stranded cost payment based on FERC’s policy guidelines in Order 888. LEI’s calculation of market value for the released energy and capacity from the incumbent t provided was based on its own forecast of energy and capacity prices in the MISO markets. LEI’s report was filed with FERC as part of the litigation procedures. Barbara was responsible for the capacity market analysis, reviewing thousands of capacity transactions in the MISO region.

<i>Date:</i>	April – December 2019
<i>Location:</i>	Canada
<i>Company:</i>	Ontario Power Generation (“OPG”)
<i>Description:</i>	LEI was engaged to support Ontario Power Generation in relation to its second-generation hydroelectric payment amounts price-cap application before the Ontario Energy Board (“OEB”). The project involved performing an updated TFP study reflecting the OEB’s 2017 Decision on the first-generation price-cap index. Other key tasks were the preparation of analysis and written evidence assessing whether the inflation factor and treatment of the Capacity Refurbishment Variance Account remain appropriate. Barbara worked on the inflation factor, physical TFP, coauthored the report and assisted on information-gathering.

<i>Date:</i>	November – December 2019
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	For a transmission developer in the in Northeast, LEI modeled various portfolios of renewable generation assets (including wind, solar, and hydro resources) together with various quantities and technologies of storage resource to analyze, and optimize, the capacity factor and delivered price for energy on the proposed HVDC transmission line. LEI also modeled customer load at the withdrawal end of the line together with additional storage to analyze the benefits of these storage resources to provide load-following service. Barbara assisted with research on the costs and technical specifications of various storage technologies.

<i>Date:</i>	October – November 2019
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<i>Location:</i>	USA
<i>Company:</i>	Range EES
<i>Description:</i>	LEI was engaged by Range EES to analyze the local economic development benefits associated with the construction and operations of a Compressed Air Energy Storage (“CAES”) project at the site of the soon-to-be-retired Intermountain Power Project plant in Millard County, Utah (the “Project”) using the REMI PI+ model. Barbara assisted the REMI modeler with research, conducting model runs and in the composition of the final report.

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

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

<i>Date:</i>	January 2018 – January 2019
<i>Location:</i>	USA
<i>Company:</i>	Public Utility Commission of Ohio
<i>Description:</i>	LEI was engaged in 2018 by the Public Utility Commission of Ohio to perform a management/performance audit of the Alternative Energy Rider of the Ohio Power Company (AEP Ohio). LEI examined processes involved in procuring RECs and SRECs.

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

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

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

<i>Date:</i>	March - August 2018
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<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	For a non-governmental organization ("NGO") LEI examined the current and future role of Enbridge Line 5 on oil consumers and producers in the State of Michigan. LEI's analysis covered a) the extent to which refineries which serve Michigan consumers require Enbridge Line 5 to provide crude oil; b) the extent to which consumers of propane in Michigan's Upper Peninsula rely on Enbridge Line 5; and c) the extent to which producers of crude oil in Michigan's Lower Peninsula rely on Enbridge Line 5. Barbara assisted with research tasks and coauthored the report.

<i>Date:</i>	May - July 2018
<i>Location:</i>	Maine, USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained to assess the financial viability of select biomass power plants in the next few years and confirm the plant's assertion that a discount on certain transmission costs was required in order to avoid plant closures. Barbara led the engagement, creating an estimated pro forma income statement to assess whether the select biomass plants are expecting to make positive (or negative) gross profit margin in the next few years, 2018-2021. The financial model presented a range of market revenues that the power plants can earn from the sale of energy, capacity, and RECs in ISO-NE's control area, relative to an estimate of going forward operating costs for two power plants. The model included five scenarios.

<i>Date:</i>	January - July 2018
<i>Location:</i>	USA
<i>Company:</i>	Maine PUC
<i>Description:</i>	LEI was retained by the Maine PUC to review and critique the analysis filed by Central Maine Power ("CMP") regarding the benefits to Maine resulting from the New England Clean Energy Connect ("NECEC"), which is a 1,200 MW HVDC Transmission Line from the Quebec-Maine border to Lewiston. The analysis includes work related to the regional energy markets, including the effect of the NECEC on a) wholesale energy, capacity, and ancillary service costs for Maine ratepayers b) impact on price volatility during natural gas price spike events; and c) greenhouse gas (GHG) reduction benefits. In addition, the analysis will also include work related to economic benefits to Maine from the NECEC including a) job creation, both direct and indirect; b) employment impacts from electricity price reductions and associated cost savings; c) economic development benefits and d) municipal tax revenues. Barbara was responsible for the natural gas price outlook review and performing natural gas forecast.

<i>Date:</i>	February - April 2018
<i>Location:</i>	USA
<i>Company:</i>	Columbia University Center for Global Energy Policy
<i>Description:</i>	LEI was engaged by the Columbia University School of International and Public Administration's Center on Global Energy Policy ("CGEP") to conduct econometric analysis of global oil (crude oil and key refined products) demand and its income and

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	price drivers. Barbara conducted a portion of the econometric analysis using STATA and coauthored the report.
<i>Date:</i>	November 2017 – March 2018
<i>Location:</i>	USA
<i>Company:</i>	PacifiCorp
<i>Description:</i>	LEI was retained as an independent evaluator ("IE") by PacifiCorp for its system-wide 2017 Solar RFP. LEI reviewed PacifiCorp's Solar RFP, facilitated and monitored communications between PacifiCorp and bidders, performed a review of the initial shortlist evaluation and scoring, and filed status reports and the IE closing report. Barbara coauthored the status and IE report, and managed the information-gathering and summarizing process, which involved information from over 100 bids, and multiple documents from each bidder.
<i>Date:</i>	August 2017
<i>Location:</i>	Canada
<i>Company:</i>	Confidential client
<i>Description:</i>	For a large utility, LEI performed a detailed bottom-up analysis of the range of costs for building a utility-scale solar farm in a Canadian province. LEI researched potential costs for multiple solar module technologies, interconnection options, and land types. The cost analysis customized the hardware, labor, and other costs into the province's business landscape so as to create an accurate representation of the costs for building a solar generation resource. Barbara assisted on the research, composition of the cost model and final report.
<i>Date:</i>	May 2017 – August 2017
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained to provide a research paper highlighting the opportunity to evolve system planning practices to a more resilient transmission system in the longer term, one that promotes efficient electricity production and consumption decisions and efficient infrastructure investment. Barbara assisted on the research tasks.
<i>Date:</i>	May 2017
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	For a private equity client, LEI reviewed all investable energy sectors in the US and Canada (except oil and gas exploration and production). The sectors included: electricity generation (natural gas, wind, solar, hydro), AMI, distributed Resources, demand response, retail and gentailers, gas LDCs, gas storage, gas pipeline transportation, LNG-related infrastructure, vertically-integrated utilities, electric distribution, and water utilities. LEI assessed the investment potential of each sector for the next five years and proposed a methodology to screen and identify investment opportunities and execute on these opportunities. Barbara was responsible for the electric generation sector and the Alaska regional study.

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

<i>Date:</i>	December 2015 - April 2017
<i>Location:</i>	Canada
<i>Company:</i>	Ontario Power Generation (“OPG”)
<i>Description:</i>	LEI prepared a report for OPG entitled “Empirical Analysis of Total Factor Productivity Trends in the North American Hydroelectric Generation Industry.” The purpose of this report was to share findings from LEI’s total factor productivity (“TFP”) study, which estimated TFP trends for a select group of peers from the North American hydroelectric generation industry. Data for this study covered an eleven-year period from 2002-2012. This study was further updated for newly available data (encompassing operating costs and other statistics for calendar years 2013 and 2014). LEI also supported OPG through 2017 in recommending an appropriate X factor and I factor to use in a I-X regime for hydroelectric generation. Barbara coauthored the report and assisted on information-gathering.

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

<i>Date:</i>	July - December 2016
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained by a transmission developer to serve as Independent Examiner for a proposed merchant transmission project open solicitation process. The project entailed designing the solicitation process, meeting with potential shippers on the line to garner early interest, drafting announcements and press releases, conducting information sessions, updating the solicitation website, evaluating and ranking bids, assisting both bilateral negotiations with shippers, and submitting a report to FERC as part of the developers' Section 205 filing. Barbara coauthored the IE report and managed the information-gathering.

<i>Date:</i>	June 2016
<i>Location:</i>	USA
<i>Company:</i>	Confidential client

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<i>Description:</i>	LEI was retained by a transmission utility to provide an overview of resources in the Chicago area and the Commonwealth Edison (“ComEd”) zone and analyze the congestion of several nodes within the Chicago area and shorelines sites of Lake Michigan. Barbara assisted with research tasks.
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<i>Date:</i>	June 2016
<i>Location:</i>	Brazil
<i>Company:</i>	Confidential client
<i>Description:</i>	For a Canadian electricity transmission company, Barbara conducted theoretical and empirical analysis of the Brazilian Electricity Market Credit Crisis highlighting interesting lessons for the Alberta market. Topics explored include: credit/financing issues, system reliability, government interventions, power market risks, resources diversity.

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

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

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

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	brief on the rules governing the market access. Barbara was responsible for the Chilean market.
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<i>Date:</i>	June - October 2015
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained by the largest electric utility company in Malaysia, to conduct a capacity building workshop on performance-based regulation (“PBR”) and technical visits to utilities and regulators worldwide that are operating under PBR-like regimes. Barbara presented to TNB’s traveling contingent on PBR Requirements standards across different jurisdictions and on fundamental of Tariff Design.

<i>Date:</i>	June 2015
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was retained to categorize the different plants in PJM into self-supply, merchant or under PPA. Barbara assisted with research tasks.

<i>Date:</i>	May - June 2015
<i>Location:</i>	USA
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was engaged by a private equity company to provide a briefing paper that compares “The Opportunities of the Buy versus Build Investment Decision.” The paper contains quantitative and qualitative research and analysis, based on market data on purchase prices from recent transactions (focused on New York, New England, and PJM), versus the cost of new build assets. Barbara assisted with research tasks.

<i>Date:</i>	April 2015
<i>Location:</i>	Colombia
<i>Company:</i>	Confidential client
<i>Description:</i>	LEI was hired by a financial investor to provide an understanding of the dynamics underpinning hydro-dominated power markets as opposed to thermal systems. As part of this project, LEI reviewed in detail the dynamics and key drivers of energy markets in a sample of Latin America countries including Colombia, Panama, Brazil and Chile. Colombia was the point of focus of the report, in this respect LEI compared and contrast several aspects of the Colombian markets to other jurisdictions and created a scoring card to evaluate Colombia against similar jurisdictions. Barbara assisted with research tasks and coauthored the report.

<i>Date:</i>	January - February 2015
<i>Location:</i>	USA, Canada and Mexico
<i>Company:</i>	Confidential client

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



Research Associate, London Economics International, LLC

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>Modeling of ELCC Accreditation Curve for Battery Storage</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>Montana-Dakota Utilities Rate Case</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>Management Audit of Entergy Mississippi</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>CMP Investment Incentives</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>