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April 8, 2021

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

Re: RFP 21.05, Docket No. S-35916 – Entergy Louisiana, LLC – Application for Authorization to Implement a Green Pricing Option, Rider GPO and River LVGPO, and Related Relief.

Dear Ms. Bowman:

Please find attached London Economics International LLC ("LEI")'s proposal to act as an outside independent technical consultant and assist the Louisiana Public Service Commission ("LPSC") with Docket No. S-35916 referenced above.

LEI is uniquely qualified for this role with extensive knowledge of ratemaking and familiarity with the Midcontinent Independent System Operator ("MISO") region, having performed a broad range of services from asset valuation to price forecasts in the region over the last two decades. Furthermore, LEI has 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 currently working for the Louisiana Public Service Commission in the matter of Docket No. R-35423 (Rulemaking to study Renewable Energy Tariff Options), the matter of Docket No. X-35522 (Audit of Fuel Adjustment Clause Filings for Cleco Power LLC), and the matter of Docket No. X-35523 (Audit of Fuel Adjustment Clause Filings for Entergy Louisiana LLC). 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 21-05 to assist the Louisiana Public Service Commission with Docket No. S-35916

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

April 8, 2021

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. S-35916, "Entergy Louisiana, LLC – Application for Authorization to Implement a Green Pricing Option, Rider GPO and River LVGPO, and Related Relief."

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

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1 Bidder information

London Economics International LLC ("LEI") is a US-owned and operated economic, financial, and strategic advisory professional services firm specializing in energy, water, and infrastructure. The firm combines a detailed understanding of specific network and commodity industries, such as electricity generation, transmission and distribution, and retail markets with sophisticated analysis and a suite of proprietary quantitative models that together produce reliable and comprehensible results. LEI's array of clients extends from the private sector to regulators and government institutions (see Figure 1).

Figure 1. Selected LEI clients throughout the world

The following attributes make LEI unique:

- ***clear, readable deliverables that are*** grounded in substantial topical and quantitative evidence;
- ***internally developed proprietary models*** for electricity price forecasting (energy, capacity, RECs, GHGs credits, etc.) that incorporate a detailed assessment of fundamentals, game theory, real options valuation, Monte Carlo simulation, and sophisticated statistical techniques;
- ***a balance of private and public sector clients*** enables LEI to effectively advise both regarding the impact of regulatory initiatives on private investment and the extent of possible regulatory responses to individual firm actions; and
- ***worldwide experience*** backed by a multilingual and multicultural staff.

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 broad experience in rate and tariff design, 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 understands the perspective and objectives of state regulators, having worked with many regulators. The firm has experience testifying on a variety of issues related to rate design, competitive markets, and long-term planning.

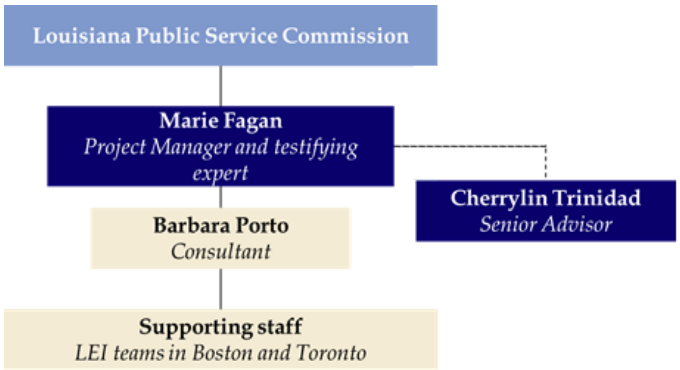
Based on the requirements of the engagement, LEI has gathered a select team of professionals with the required qualifications to assist the LPSC. The team possesses considerable independent assessment expertise, analytical and technical capabilities, and strong understanding of power markets, including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

There will be 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*
- ***Cherrylin Trinidad,*** *Director*
- ***Barbara Porto****, Consultant*

Marie Fagan will have overall responsibility for the project and will act as project manager and testifying expert. ***Cherrylin Trinidad*** will serve as senior advisor. ***Barbara Porto*** will serve as a core team member. In addition, LEI staff in Boston and Toronto 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, North American gas markets, and North American power markets. She has advised C-suite

industry clients, buy-side and sell-side financial clients, as well as legislators and regulators. For state agencies, she has served as an expert witness and managed lengthy, high profile projects. She has led LEI projects for the LPSC.

Cherrylin Trinidad is a Director at LEI, experienced in the areas of regulatory economics, tariff design, and related issues. She has participated in multi-million-dollar projects in North America and internationally involving tariffs and ratemaking.

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

Full CVs of the key team members are available in Section 6 (Appendix A).

2 Qualifications and experience

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

2.1 Understanding of the engagement

LEI is aware that Entergy Louisiana, LLC ("ELL") recently filed an application seeking authorization to implement two new renewable options: Green Pricing Option ("Rider GPO") and Large Volume Green Pricing Option ("Rider LVGPO"). The proposed Rider GPO and Rider LVGPO set forth parameters under which ELL's end-use customers can match some or all of their monthly electricity usage with renewable energy credits ("RECs") that are generated and/or purchased by ELL and retired on the customer's behalf.

LEI understands LPSC is looking for an outside consultant to assist in the review of ELL's application to establish these two new green pricing options through Riders GPO and LVGPO. The scope of representation as described in the RFP must include, but is not limited to:

- reviewing the filing, pre-filed direct testimony, and accompanying support;
- assisting in drafting, reviewing, and responding to discovery;
- assisting in preparing direct and cross-answering testimony;
- aiding in drafting pleading and motions;
- appearing at hearings and open meetings;
- participating in depositions;
- assisting with trial preparations, including assistance with drafting cross examination of witnesses;
- reviewing and analyze stipulation terms; and
- participating in/conducting informal meetings with parties and commissioners as necessary.

2.1.1 Familiarity with LPSC General Orders and minimum RFP requirements

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

1) The Commission's General Order No. 2 dated July 1, 1921 requiring all regulated public utilities to maintain tariffs on file with the Commission, as well as the "filed rate" doctrine.

General Order No. 2 requires all companies providing utility and telecommunications services within the state of Louisiana and under the jurisdiction of the LPSC to file an annual report of financial and operating conditions.[1] The filed rate doctrine forbids a utility to charge any rate other than the one on file with the Commission. To charge for services under a tariff, a utility must provide its services in exactly the way they are described in that tariff.

[1] Louisiana Public Service Commission. <http://www.lpsc.louisiana.gov/gasannualreports.aspx>

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.[2]

3) The Commission's General Order dated April 20, 2012 (Corrected) (Docket No. R-30021) regarding electric utilities filing Integrated Resource Plans.

The General Order allows utilities to include DR programs in integrated resource plans ("IRPs"). DR programs "*may include direct load control (such as air conditioners and water heaters), or incentive rates designed to induce loner electricity use at times of high wholesale market prices or when system reliability is jeopardized.*"[3] The order establishes that industry standard screening tests, such as the California Standard Practice Tests, a widely-used standard adopted by utility commissions in the United States, be used in screening DR programs.

4) The Commission's General Order dated July 1, 2019 (Docket No. R-34738) providing requirements for all jurisdictional electric utilities when filing tariffs, rate schedules and rate riders with the Commission.

A site-specific contract could be interpreted as contrary to the filed rate doctrine, which prohibits electric utilities from offering any rate for service unless such rate has been filed with the Commission, as noted above. Section 601 of the General Order in Docket No. R-34738 establishes that "*site-specific contracts are the exception, and not the norm, and that the Commission should not favor the use of site-specific contracts unless a specific public interest is shown by granting a discounted rate to one customer…*" and "*there should be a compelling reason greater than just load growth… which is used to justify a public interest determination for the allowance of a site-specific contract.*"[4]

The Order established the format and content requirements for a site-specific application, the minimum requirements to be considered, and the process for review and approval by the Commission. Site-specific contract requests are treated as confidential matters.

5) MISO tariffs, rules and planning processes.

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

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[2] Justia. "Dixie Elec. Mem. v. La Public Service Com'n." <https://law.justia.com/cases/louisiana/supreme-court/1983/83-ca-1196-1.html>

[3] Louisiana Public Service Commission. "*Corrected* General Order." <https://www.entergy-louisiana.com/userfiles/content/irp/LPSC_General_Order_R30021.pdf>

[4] Louisiana PSC. "General Order 7-1-2019 (R-34738)." July 1, 2019. <https://lpscpubvalence.lpsc.louisiana.gov/portal/PSC/DocumentDetails?documentId=140796>

and ten other North American power markets. A sample of relevant MISO experience including tariffs, rules and planning processes is shown in Section 2.2.3.

6) Electric utility ratemaking and general issues such as accouting standardas and practices.

LEI has extensive experience in electric utility ratemaking, and accounting standards and practices. A sample of relevant experience including rate design, tariffs, and auditing is shown in Section 2.2.1.

7) Familiarity with Green Tariff programs and products offered by public utilities.

In competitive/de-regulated markets, retail customers can shop for green or renewable energy products, such products are provided by the default service provider (the local utility), or by competitive retail energy suppliers. However, this only applies if the individual state allows retail choice, i.e., allows customers to choose an energy supplier which is not the incumbent distribution utility. In MISO, only Illinois allows retail competition. Customers in the rest of MISO, including those in Louisiana, must buy electricity from their traditional vertically integrated utility.

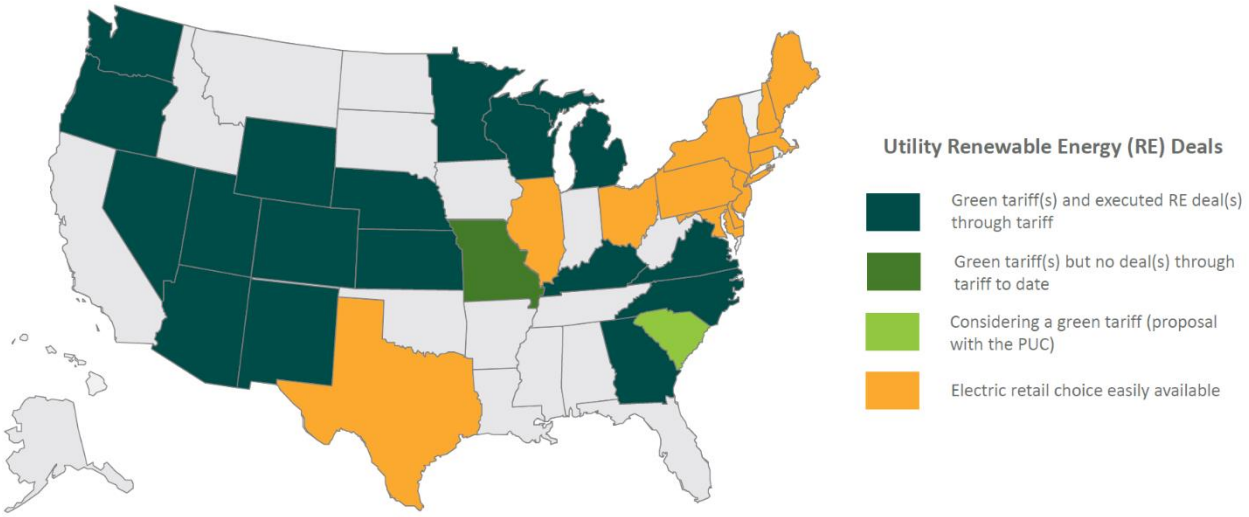
A traditional vertically integrated utility might offer a green or renewable option, which typically has been a renewable energy product priced at a premium to the regular energy product. This allows consumers to express preferences for renewable versus fossil-fueled power. The premium is not designed to, nor is it necessarily intended to, protect the customer from rate fluctuations driven by changes to the cost of fossil fuels.

However, another type of green power product is becoming available in traditional regulated areas. These are known as "green tariffs." Green tariffs are green power products from a specific bundle of renewable energy projects procured by the utility. Green tariffs allow the customer to benefit from the fixed procurement cost of renewable or green power, and as such green tariffs offer a hedge against changes to the cost of fossil-fuel generation.

The first green tariff was offered by NV Energy in 2013, and the product innovation then caught on rapidly. As of May 2020, 19 states either offer green tariffs or are considering doing so. Many states also allow one-on-one arrangements between large retail customers and renewable energy providers (see Figure 3).

Based on LEI's expertise in renewable tariffs, LEI has been engaged by the LPSC for the past 12 months in a project examining options for renewable tariffs in Louisiana (Docket No. R-35423).

Figure 3. States with green tariff programs as of May 2020



Source: World Resources Institute/Renewable Energy Buyers' Alliance. *US Electricity Markets: Utility Green Tariff Update. May 2020.* <https://www.wri.org/our-work/project/clean-energy/utility-green-tariffs>

2.2 Selected experience

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

2.2.1 Rate design, tariffs, and accounting/auditing

LEI has experience in rate design and tariff design in the United States and globally. LEI's experience in utility management auditing provides LEI with hands-on familiarity with accounting standards and practices.

- ***Rulemaking to study renewable energy tariff, aka "green tariff" options:*** LEI supported the LPSC in Docket No. R-35423. LEI provided framing questions for stakeholder feedback on green tariff options, evaluated stakeholder responses, provided in-depth case studies of green tariffs in other US jurisdictions, and provided other consultatory services for the Commission.
- ***Audit of fuel adjustment clause for Entergy Louisiana:*** LEI was engaged by LPSC, Docket No. X-35523, to perform an audit of the Fuel Adjustment Clause filings of Entergy Louisiana. The audit involved detailed examination of monthly true-ups of incurred costs with billed costs; the 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 prudency and reasonableness of costs incurred for oil, gas, coal, and nuclear fuel and transportation, and an assessment operating performance of utility generating assets.

- ***Audit of fuel adjustment clause for Cleco Power:*** LEI was engaged by LPSC, Docket No. X-35522, to perform an audit of the Fuel Adjustment Clause filings of Cleco Power. The audit involved detailed examination of monthly true-ups of incurred costs with billed costs; the appropriateness of interest rates as applied to over-recovered or under-recovered costs; examination of the impact of deferred costs; reconciliation of expenses recorded in FERC Form 1 account categories ("as booked") with expenses included in monthly fuel adjustment clause filings; the prudency and reasonableness of costs incurred for oil, gas, coal, and lignite; and transportation; and an assessment operating performance of utility generating assets.
- ***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"). Aspects of the audit included assessing the reasonableness and prudency 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 prudency of fuel purchases. LEI also audited charges and true ups related to the company's quarterly PSR filings. Marie supervised and directed the audit.
- ***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"). Aspects of the audit included assessing the reasonableness and prudency 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 prudency of fuel purchases. LEI also audited charges and true ups related to the company's quarterly PPA filings. Marie supervised and directed the audit.
- ***Rate design for Kansas:*** LEI was selected by the Kansas Legislative Coordinating Council ("LCC") to perform a study of the retail rates of Kansas public electric utilities. The purpose of the study was to inform electric sector policies and result in competitive electric rates and reliable electric service in Kansas. Part of the study focused on exploring options for retail electricity tariffs.
- ***Comparison of rates for retail consumers:*** LEI was retained by a power industry advocacy group to review rates charged to final consumers across Canada and identify distortions in rate design across provinces. LEI performed modeling to account for distortions and developed appropriate calculations to appropriately compare rates across jurisdictions.
- ***Rate impact study:*** LEI was engaged by an industry association to perform a study of the impact of electricity rates on Ontario's manufacturing sector. The scope of work consisted of a review of Ontario industrial electricity rates and rate designs; assessment of competitive electricity rate levels; development of options to change rates in a manner consistent with rate setting principles and beneficial to industrial consumers and the

Province; quantification of economic benefits from appropriate rate adjustments; and consultation with industry and government officials and experts.

- ***Management of rate case filing:*** LEI was retained by the largest electric utility company in Malaysia to provide project management services for the client's performance-based regulation ("PBR") submission. LEI's scope of work consisted of several tasks: proposing the policy and governance framework for the PBR submission; providing a detailed project plan; assessing the regulatory requirement model; ensuring accurate and timely delivery of workshops; and reviewing the filing before submission.
- ***Tariff review:*** LEI's consortium was awarded a contract by the Argentine regulatory authority to conduct a tariff review of Edenor, a large utility. The LEI-led consortium advised the regulator on international best-practice design of tariffs, proposed a tariff setting methodology, provided technical assistance in the analysis of information presented by Edenor, proposed tariffs, and assisted the regulator during public hearings.
- ***Tariff design:*** LEI was commissioned to support the Saudi Arabian power regulator in setting an electricity tariff. The work entailed data collection, assessment of costs of generation, transmission, and distribution, development of appropriate tariff setting methodologies, analysis of possible incentive mechanisms, drafting and creating regulatory tools, and helping to create the tariff review unit.
- ***Audit of alternative energy tariff rider:*** LEI was engaged by the Public Utility Commission of Ohio ("PUCO") to perform a management/performance audit of the Alternative Energy Rider of the Ohio Power Company ("AEP Ohio"). LEI examined processes involved in procuring renewable energy credits ("RECs") and solar renewable energy credits ("SRECs"). LEI worked closely with the financial auditor to ensure all relevant accounting categories were accurately assigned. LEI compared and benchmarked AEP Ohio RECs and SRECs costs and other operational results against data from public sources. LEI modeled the impact on ratepayers.
- ***Management audit of a major utility in MISO:*** LEI was engaged by the Mississippi Public Service Commission ("MPSC") to perform a two-year audit of the management activities of a major vertically integrated utility. LEI assessed the utility's practices for economic purchase and use of fuel and electric energy, evaluated fuel and energy contract terms, investigated the operations of the utility's coal and nuclear generation units, and reviewed the prudency of coal inventory levels and inventory control procedures. LEI also audited the prudency of MISO operations and overall plant operations. Following the two-year audit, the MPSC engaged LEI for another two years to audit the other major vertically integrated utility in the state.
- ***Fairness monitor for evaluation of feed-in tariff applications:*** The LEI team aided in the design of the evaluation framework of renewables feed-in tariff ("FIT") applications and provided on-going support during the evaluation process. LEI staff performed a mock evaluation in parallel with the client (the Ontario Power Authority ("OPA")) as a method of auditing the results. The LEI team also prepared a final report that outlined LEI's opinion as to the fairness of the overall process.

2.2.2 Renewable resource engagements

The following engagements highlight the many renewable-related projects performed by LEI and the project team:

- ***Renewables implementation:*** LEI was retained by Kentucky's regulator to review regulatory policies and tariff structures to determine how they could be altered to elicit demand reductions and renewables implementation. The review process consisted of analyzing the current processes for renewable and distributed generation and demand-side management programs, and proposing recommendations to improve the efficacy of these programs. The engagement included stakeholder interviews to solicit feedback on the necessary updates to the planning and approval process.
- ***Renewable energy potential for Hawaii:*** LEI assessed possible ownership and regulatory options for achieving Hawaii's policy objective: a transition to 100% renewable energy by 2040. LEI's two-year engagement entailed extensive stakeholder outreach, assessment of ownership and regulatory models in other jurisdictions, and recommendations for Hawaii.
- ***Renewable power in the Netherlands:*** LEI analyzed the project financing of an offshore wind project off the Dutch continental shelf. The team evaluated the Dutch electricity markets, the impact of the government's subsidies not only on the specific project but on future renewable projects as well.
- ***Designing large scale renewable energy procurement program:*** LEI was engaged by the government of a Middle Eastern country to develop a recommended design for renewable energy competitive procurements, a feed-in tariff program, and a sustainable energy procurement company.
- ***Monitored regulatory and legislative developments affecting the renewable energy credit markets***: For an international power producer, LEI monitored ongoing regulatory and legislative activities across the United States. As part of this process, LEI helped the client interpret business implications of pending and potential regulatory changes and legislation.

2.2.3 MISO region experience

LEI closely monitors the MISO market for ongoing client work. LEI also produces a semi-annual regional market update and wholesale price forecast for eleven North American power markets, including MISO. LEI's deep understanding of the MISO market serves as a solid foundation for this engagement.

- ***Due diligence for a potential asset acquisition in MISO:*** LEI was engaged to assist in due diligence for a gas-fired generation asset. LEI reviewed contracts and performed financial analysis, with a specific focus on the assumed market value of capacity in the long term, and locational marginal prices for energy. Work involved reviewing documents in a virtual data room, and analysis related to drivers of gross margin for the asset:

macroeconomics, weather fluctuations, fuel and electricity cost projections; and an overview of the gas and electricity market in the region.

- ***Revenue opportunity for gas-fired cogeneration units in MISO:*** LEI was engaged to inform the client of potential risks upon the termination of power purchase agreements ("PPAs"). LEI simulated MISO's energy and capacity markets and derived forecasts of wholesale energy prices and capacity prices relevant to the units' geographic location.
- ***Economic analysis for a proposed transmission project in MISO:*** LEI conducted a modeling exercise to determine the potential revenues for a proposed transmission project wheeling power from western MISO to eastern MISO (and eventually PJM). LEI evaluated both the revenue opportunities to the investors as well as social benefits to the MISO system and evaluated the incremental value of the business strategy of selling the energy and capacity out of eastern MISO to third parties in PJM.
- ***Costs/benefit analysis of Entergy joining an RTO:*** LEI was hired by the Public Utility Commission of Texas ("PUCT") to provide a cost/benefit analysis of the decision by Entergy to join MISO. LEI provided quantitative and qualitative analyses of specific costs/benefits attributable to Entergy Texas, Inc. ("ETI") and its customers following membership in MISO compared with membership in the Southwestern Power Pool ("SPP").
- ***Review of ETI's impact analysis related to termination of a PPA:*** LEI was hired by the PUCT to conduct a due diligence review of the analyses performed by ETI on the impact of the termination of specific PPAs while a member of MISO. LEI's scope of work included a review of ETI's inputs, results, methodology, and interpretation of MISO market rules.
- ***Estimating coal plants' energy and capacity revenues in MISO:*** For a large foreign utility, LEI performed the valuation of two power plants to determine their potential value upon expiration of an ongoing PPA. The plants' revenues were calculated based on LEI's 25-year forecasts of electricity prices in their respective zones. Given the long-term horizon of the modeling exercise, LEI also simulated an organized capacity market based on the resource adequacy requirements of MISO to estimate potential capacity revenues for the plants.

2.2.4 Expert witness experience

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

- ***Independent expert assessing role of Enbridge Line 3 for Minnesota***: LEI was engaged as the independent market expert assisting the Minnesota Department of Commerce in evaluating the application of Enbridge Energy for a Certificate of Need for its Line 3 oil pipeline expansion project. LEI provided written testimony, responded to interrogatory requests, and provided written surrebuttal and oral testimony. [Docket No. PL-9/CN-14-916, OAH Docket No. 65-2500-32764]
- ***Independent expert related to Maine Energy Cost Reduction Act:*** LEI was engaged by the State of Maine Public Utilities Commission ("MPUC") to assist in evaluating options for

expansion of natural gas supply into Maine. LEI authored pre-filing reports, responded to discovery from other parties, prepared discovery questions and cross-examined witnesses, reviewed testimony by other parties and provided assessments of the issues presented, and served as an expert witness in the proceedings. [MPUC Docket No. 2014-071] URL: https://mpuc-cms.maine.gov/CQM.Public.WebUI/Common/CaseMaster.aspx?CaseNumber=2014-00071

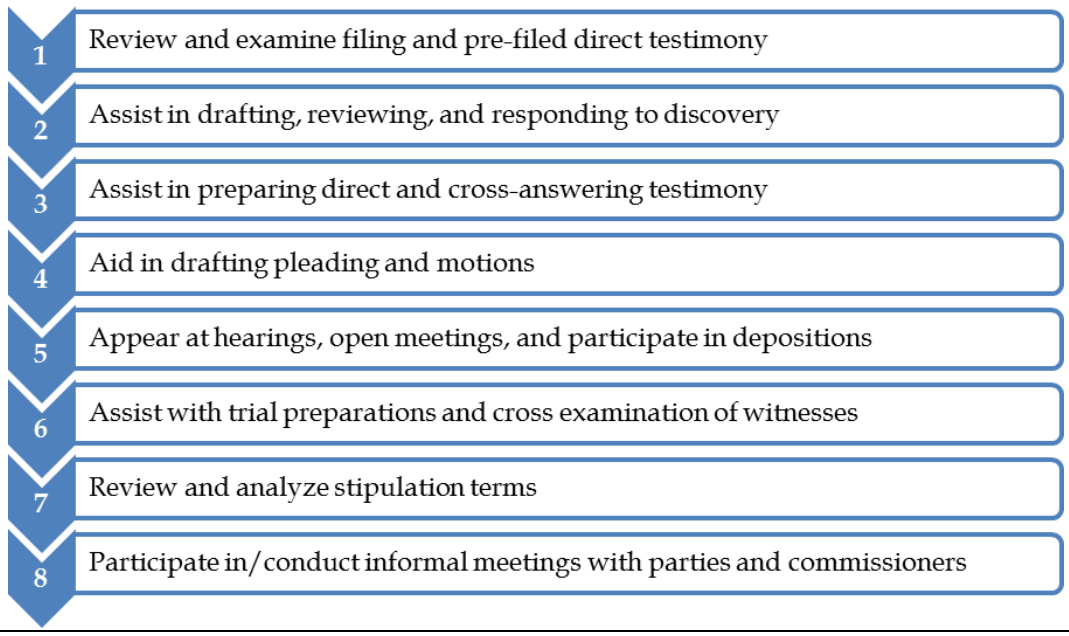
- ***Testimony related to transmission operating rules and curtailment protocols for interties into Alberta:*** Rules were promoted by Alberta Electricity System Operator ("AESO") in order to support a fair, efficient and openly competitive power market. The LEI testimony was made in front of the Alberta Utilities Commission ("AUC"), on behalf of Morgan Stanley Capital Group ("MSCG"), a customer of the Montana-Alberta Transmission Line. LEI's analysis considered commercial as well as operating protocols in deregulated power markets and how market rules incentivize new entry and produce dynamic efficiency gains. AUC Docket Number 1607958. URL: http://www.auc.ab.ca/regulatory_documents/Pages/default.aspx
- ***ISO-New England tariff design:*** LEI submitted testimony on behalf of ISO-New England ("ISO-NE") to the FERC to help defend the ISO's- self-funding tariff. LEI first defined the basic underlying economic principles for specifying the tariff, and then undertook to show how the tariff should be applied to various system users. The engagement involved intensive financial modeling and frequent interaction with stakeholders. (2000) [ER01-316-000]
- ***Triennial market power analysis (southeast region):*** In support of a client's application to renew market-based rate authorization under the jurisdiction of FERC, LEI performed Pivotal Suppliers Analysis and Market Share Analysis for the Entergy balancing authority area. (2011) [ER97-4281 et al.]
- ***Section 203 and 205 analysis in support of NRG's acquisition of certain Dynegy assets in CAISO and ISO-NE:*** LEI was engaged to provide testimony in support of a proposed acquisition. LEI performed a Delivered Price Test ("DPT") for the California Independent System Operator ("CAISO") and ISO-NE energy markets as well as a standalone Herfindahl-Hirschman Index ("HHI") analysis for the capacity markets. (2010) [EC10-88-000]
- ***Analysis of generation market power under FERC's indicative screens for market-based rate authorization:*** In support of the acquisition of a 21-MW solar photovoltaic (PV") facility, LEI performed an updated market power analysis for acquirer's affiliates in the California ISO which have been granted market-based rate authorization, and prepared the related Section 203 filing. (2010) [ER10-204-000]

3 Proposed plan of action

Based on the RFP requirements and LEI's previous experience working on tariff and rate design, LEI proposes several tasks to structure this engagement (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 these 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. LEI senior staff will be available to attend or lead technical conferences, if any, and conduct informal meetings with parties as needed.

Figure 4. Major tasks



3.1 Task description

Based on the RFP, LEI envisions 8 tasks with associated deliverables. These are summarized in Figure 4 above and discussed in detail below.

3.1.1 Task 1: Review and examine filing and pre-filed direct testimony

LEI will examine ELL's recently filed application seeking authorization to implement Riders GPO and LVGPO and consistency with General Orders noted in Section 2.1 above. LEI will review all ELL's and intervenors' filings in this matter, or as required by Staff.

Deliverable associated with Task 1

The deliverable for Task 1 will be a memo containing LEI's initial findings about the implications of ELL's Riders GPO and LVGPO and its suitability in the MISO context, and initial findings on other relevant issues which may become apparent.

3.1.2 Task 2: Assist in drafting, reviewing, and responding to discovery

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

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

Deliverable associated with Task 2

The deliverable(s) under Task 2 will be a set of written discovery questions related to initial filings and testimony, and follow-up discovery questions if needed, related to rebuttal and surrebuttal testimony.

3.1.3 Task 3: Assist in preparing direct and cross-answering testimony

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

Deliverable associated with Task 3

The deliverable(s) under Task 3 will be written direct testimony, written rebuttal testimony, and written surrebuttal testimony as needed.

3.1.4 Task 4: Aid in drafting pleading and motions

LEI will provide support for drafting any pleading and motions seeking the commence of a new proceeding or ruling, as needed, based on the findings from the previous tasks.

Deliverable associated with Task 4

The deliverable(s) under Task 4 will be written memos as needed.

3.1.5 Task 5: Appear at hearings, open meetings, and participate in depositions if needed

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

Deliverable associated with Task 5

The deliverables under Task 6 are in-person attendance at scheduled hearings, open meetings, and participation in depositions by LEI's testifying witness, Marie Fagan. Dr. Fagan may be accompanied by other LEI staff as needed.

3.1.6 Task 6: Assist with trial preparations and cross examination of witnesses

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

Deliverable associated with Task 6

The deliverable(s) under Task 6 will be a memo with cross-examination questions, organized by topic and theme.

3.1.7 Task 7: Review and analyze stipulation terms

LEI will review stipulation terms from the ELL's Riders GPO and LVGPO proceeding to ensure consistency with General Orders, MISO rules, and other issues.

Deliverable associated with Task 7

The deliverable(s) under Task 7 will be a written memo as needed, or a conference call with Staff.

3.1.8 Task 8: Participate in/conduct informal meetings with parties and commissioners

LEI's team is committed to participate in and/or conduct informal meetings as needed.

Deliverable associated with Task 8

The deliverable(s) for Task 8 is participation in informal meetings in person, and/or conference calls, by LEI's testifying witness, Marie Fagan. Dr. Fagan may be accompanied by other LEI staff as needed.

4 Timeline and budget

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

4.1 Timeline

As indicated in the RFP, the time period required for the matter is estimated at approximately 12 months. LEI expects that the schedule and the deadlines will be finalized during the kick-off meeting, or shortly before or after. LEI commits to having the three key staff members noted in Section 1.2 available for the entire period of the project.

4.2 Professional fee budget (not-to-exceed)

LEI offers a total professional fee budget not to exceed **$42,915** (see Figure 5).

Figure 5. Professional fee budget

		Budget	Estimated hours
Kickoff meeting	$	2,110	7
Task 1: Review and examine filing and pre-filed direct testimony	$	5,570	26
Task 2: Assist in drafting, reviewing, and responding to discovery	$	4,945	21
Task 3: Assist in preparing direct and cross-answering testimony	$	4,755	17
Task 4: Aid in drafting pleading and motions	$	4,755	17
Task 5: Appear at hearings, open meetings, and participate in depositions	$	5,070	15
Task 6: Assist with trial preparations and cross examination of witnesses	$	5,195	16
Task 7: Review and analyze stipulation terms	$	5,445	18
Task 8: Participate in/conduct informal meetings with parties and commissioners	$	5,070	15
Total	**$**	**42,915**	**152**

Indicative

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

Figure 6. LEI's professional fee rates

Assigned Staff	Position	Hourly rate	Discounted rate	Discounted daily rate
Cherrylin Trinidad	Director	$575	$370	$2,960
Marie Fagan	Chief Economist	$575	$370	$2,960
Barbara Porto	Consultant	$325	$210	$1,680
Support Staff	Consultant	$325	$210	$1,680
	Research Associate	$210	$125	$1,000
	Administration	$100	$65	$520

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 **$1,000.** In addition, travel costs are estimated in Figure 7 below. LEI will comply with all expense caps as outlined in the State of Louisiana Division of Administration Travel Policies and Procedures Memorandum. Accordingly, the travel expense budget will be approximately **$2,882**.

Figure 7. Indicative travel costs

Travel	# trips	# people	# nights	Total cost
Meetings with Commission and/or Staff	2	1	1	$1,052
Preside over technical conference	1	1	1	$526
Meetings with parties	2	1	2	$1,304
Total estimated costs				**$2,882**

Indicative

4.4 Total budget

The total indicative budget including professional fees, travel, and other expenses therefore amounts to **$46,797.**

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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Marie N. Fagan, PhD

Chief Economist

LONDON ECONOMICS

KEY QUALIFICATIONS:

Marie Fagan is the Chief Economist at London Economics International, LLC, based in Boston, Massachusetts. With over 30 years of experience in research and consulting for the energy sector, Marie's career has spanned international upstream and downstream oil and gas, global coal, North American gas markets, and North American power markets. She has advised C-suite industry clients, buy-side and sell-side financial clients, as well as legislators and regulators; she has served as an expert witness.

At LEI, Marie's expertise across electricity markets and fuels provides integrated perspectives and supports sound strategic advice for clients. She has experience as a project manager for complex, multi-year engagements, including a two-year project for the Maine Public Utilities Commission in 2014-2016, and a two-year project for the Mississippi Public Service Commission in 2017-2019. She has deep experience in econometric analysis.

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

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

From 1996-2014, she was with Cambridge Energy Research Associates ("CERA"), now part of IHS 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, New England Women in Energy and Environment, and the Boston Economic Club. She is Vice President of Business for the US Association for Energy Economics.

EDUCATION:

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

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

EMPLOYMENT RECORD:

Date:	2014-present
Location:	Boston, MA
Company:	**London Economics International LLC ("LEI")**
Position:	Chief Economist (Jan 2020 to present); Managing Consultant and Lead Economist (2016-2019); Managing Consultant (2014-2015)

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

Position:	Senior director, Upstream Strategy Advisory service (2012-2014). • 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 Senior director, North American Gas, Power, and Renewables group (2007-2011). • 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 Director/Senior director, CERAView Institutional Investor Service (2004-2007) • 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, *Investors' Energy Monthly*, and served as publication's executive editor. In this role, won the IHS Circle of Excellence Award in 2005 Director, North American Gas Advisory service (2003-2004) • 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.

Date:	2001-2002
Location:	Boston, MA
Company:	**International Human Resources Development Corporation ("IHRDC")**
Position:	Director, International Gas Program • 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.

Date:	1996-2001
Location:	Cambridge, MA
Company:	**CERA**
Position:	Associate director, Global Oil advisory service (1999-2001) • Authored original research reports, responsible for client presentations and the management, execution, and delivery of consulting projects. Associate, Global Oil advisory service (1996-1998) • 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:	Economist • 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:	Research associate/Associate • Performed economic and econometric analysis, modeling, and forecasting to support the Energy Information Administration energy end-use models. Designed the National Energy Modeling System's Commercial Energy Demand Model; conducted financial analysis of energy companies.

Date:	1988
Location:	Washington DC
Company:	**US Department of Energy, Office of Policy, Planning and Analysis**
Position:	Intern • Researched waste-to-energy potential in the United States; constructed a database, developed econometric models, analyzed results and produced written reports.

RECENT PROJECT EXPERIENCE:

Date:	August 2020 - present
Location:	Louisiana
Organization:	Louisiana Public Service Commission
Description:	**Audit of fuel adjustment clause for 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 prudency and reasonableness of costs incurred for oil, gas, coal, and nuclear fuel and transportation, and an assessment operating performance of utility generating assets.

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

Date:	June 2020 – October 2020
Location:	Ohio
Organization:	Public Utilities Commission of Ohio
Description:	**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"). Aspects of the audit included assessing the reasonableness and prudency 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 prudency of fuel purchases. LEI also audited charges and true ups related to the company's quarterly PSR filings. Marie supervised and directed the audit.

Date:	May 2020 – September 2020
Location:	Ohio
Organization:	Public Utilities Commission of Ohio

Description:	**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"). Aspects of the audit included assessing the reasonableness and prudency 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 prudency of fuel purchases. LEI also audited charges and true ups related to the company's quarterly PPA filings. Marie supervised and directed the audit.

Date:	February 2020 - present
Location:	Louisiana
Organization:	Louisiana Public Service Commission
Description:	**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.

Date:	November 2019
Location:	Japan
Organization:	Private equity investor
Description:	**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. The report covered i) the structure of Japanese electric power industry, and ii) the status of de-regulation and environmental policy. Based on this, LEI developed two reasonable scenarios for wholesale prices based on two different paths for energy supply and demand to 2040 and beyond.

Date:	October 2019 – November 2019
Location:	ERCOT
Organization:	European investor-owned utility
Description:	**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.

Date:	July 2019 - August 2019
Location:	Alberta, British Columbia
Organization:	Counsel for natural gas producer
Description:	**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.

Date:	May 2019 - September 2019
Location:	United States, New England
Organization:	Investor-owned gas distribution utility
Description:	**Econometric benchmarking analysis of utility performance** LEI was engaged by an investor-owned local gas distribution company to support its rate filing for performance-based ratemaking. Marie led an econometric benchmarking analysis of utility performance. 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. The benchmarking report was used by counsel to develop the company's strategy for the rate filing.

Date:	October 2018 – April 2018
Location:	United States, ISO-NE
Company:	Massachusetts Office of the Attorney General
Description:	**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 facing the electric power sector. Marie led the project, including developing an independent definition of the problem to be solved; developing of solutions, identifying potential allies in the NEPOOL stakeholder community; analyzing other stakeholders' proposals; and working with the AGO in the stakeholder process. LEI developed an alternative proposal, a forward auction for stored energy reserves based on the financial concept of an American call option with a two-dimensional bid (the option premium and strike price). LEI demonstrated that relatively simple algorithms could result in cost-effective clearing of such an auction.

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

Date:	September 2018-December 2018
Location:	United States, ISO-NE
Company:	Maine Public Utilities Commission
Description:	**Avoided energy supply costs** 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.

Date:	June 2018-December 2018
Location:	United States, PJM
Company:	Ohio Public Utilities Commission
Description:	**Management performance and financial audit of large utility** LEI was engaged to perform a management performance and financial audit of AEP Ohio's Alternative Energy Rider ("AER"). Marie led the project which required examining the terms of power purchase agreements ("PPAs") for wind and solar power, the cost of renewable energy credits ("RECs"); energy and capacity market prices; inventory strategies, and the accuracy of AEP Ohio's load forecasts. Marie recruited a local Ohio accounting firm to perform the financial portion of the audit; she provided guidance (as the firm had not previously audited a utility) and oversight of their work as well as the work of the LEI in-house team.

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

Date:	July 2017-June 2018
Location:	United States, MISO, Minnesota
Company:	Minnesota Department of Commerce
Description:	**Role of Enbridge Line 3 in heavy and light crude oil supplies** 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.

Date:	June 2017-December 2018
Location:	United States, MISO, Mississippi
Company:	Mississippi Public Service Commission
Description:	**Management audit of large vertically-integrated utility** 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 prudency of coal and nuclear fuel procurement and inventory practices. Marie's team also assessed management, organization, controls, strategies, and outcomes for the company's hourly MISO offers. The team investigated the operations of a nuclear power plant, and the financial implications of the utility's power purchase agreement for nuclear power. Marie appeared before the Commission to present and defend findings.

Date:	November 2018 – February 2018
Location:	WECC
Company:	PacifiCorp
Description:	**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 a review of the initial shortlist evaluation and scoring, and the filing of status reports and the final IE closing report.

Date:	April, May 2017
Location:	United States and Canada
Company:	Private client
Description:	**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.

Date:	March 2017
Location:	Alberta, Canada
Company:	Private client
Description:	**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.

Date:	February 2017
Location:	North America
Company:	Provider of services to vehicle fleet industry
Description:	**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 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.

Date:	December 2016
Location:	Alberta, Canada
Company:	Private client
Description:	**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.

Date:	September 2016
Location:	Northeast United States
Company:	Private client
Description:	**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.

Date:	October 2016-November 2016
Location:	California, Kansas
Company:	Law firm
Description:	**Support for counsel in contested 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 opposing counsel's expert's methodology. Marie proposed an alternative, more accurate methodology for valuing the green attributes of LFG, based on market fundamentals driven by the California RPS requirements.

Date:	August 2016-October 2016
Location:	Maine
Company:	Maine Public Utilities Commission
Description:	**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.

Date:	May 2016
Location:	ERCOT/Texas
Company:	Private client
Description:	**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.

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

Date:	June 2014-April 2016
Location:	Maine
Company:	Maine Public Utilities Commission
Description:	**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 #2015-00071). Marie reviewed and evaluated proposals for firm natural gas transportation service by pipeline developers. 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.

Date:	November 2015-December 2015
Location:	US Northeast
Company:	Renewable power developer
Description:	**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, including(energy, losses, and congestion). LEI examined system limits, and assessed the risk of outages based on NERC data for NPCC. Marie led the project

Date:	October 2015-November 2015
Location:	ERCOT/ Texas

Company:	Private equity company
Description:	**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.

Date:	July 2015
Location:	North America/United Kingdom
Company:	UK Department of Energy and Climate Change
Description:	**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 rules, and international auctions for toll roads to examine whether and how duration or length of contract is incorporated into bidding.

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

Date:	April 2015
Location:	Connecticut; New Jersey
Company:	Private equity company
Description:	**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.

Date:	August 2014 - January 2015
Location:	North America
Company:	Private client
Description:	**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.

Date:	October 2014
Location:	New England
Company:	Private equity company
Description:	**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").

Date:	April-June 2014
Location:	US Midwest
Company:	Private equity company
Description:	**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. 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.

Date:	June 2014
Location:	North America
Company:	Law firm
Description:	**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.

Date:	April-May 2014
Location:	Nova Scotia
Company:	Government of Nova Scotia

Description:	**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.

PUBLICATIONS:

Technical/Academic

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

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

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

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

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

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

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

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

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

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

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

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

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

US Department of Energy

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

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

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

IHS/CERA Publications

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

SELECTED SPEAKING ENGAGEMENTS:

News Media

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

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

IHS/CERA CERAWeek Roles

Chairman, Coal Plenary *Envisioning a Long-term Role for Coal,* March 10, 2011
Chairman, Strategy Session *Financing the Power Future*, March 10, 2011
Chairman, Expert Dialog *North American Gas and Power Scenarios Wildcards*, March 9, 2011
Chairman, Strategy Session *Financing a North American Power Sector in Transition*, March 12, 2010
Panelist, CERA Insights *Global Power Outlook*, March 12, 2010
Chairman, Strategy Session *US Electric Power Transmission: the Battle of the Jurisdictions*, March 11, 2010
Chairman, Critical Issue Forum, *Financing the Power Sector in a Turbulent Economy*, February 12, 2009
Chairman, Critical Issue Forum *Power Sector Investment: Global Capital, Local Strategies* February 15, 2008
Panelist, Leadership Circle *Global Power Outlook* February 14, 2008
Chairman, Critical Issue Forum *Rising Costs and the Outlook for North American Gas*, February 14, 2007
Host and Commentator, *Reception for Institutional Investors* February 13, 2007
Panelist, Critical Issue Forum *Oil Sector Finance: the Cliff behind the Clouds?* February 13, 2007
Host and Commentator, *Reception for Institutional Investors* February 7, 2006
Chairman, Critical Issue Forum *Financing the Oil Future: A Three-Trillion Dollar Dilemma* February 7, 2006
Host and Commentator, *Reception for Institutional Investors* February 15, 2005
Chairman, Critical Issue Forum *North American Natural Gas: E&P in a Mature Region* February 11, 2004
Chairman, Expert Briefing *North American Gas E&P Strategy: Getting off the Treadmill?* February 12, 2003
Panelist, Expert Briefing *Bracing for a Wild Ride: North American Gas Market Outlook* February 11, 2003

Ma. Cherrylin Trinidad

Director

LONDON ECONOMICS

KEY QUALIFICATIONS:

Cherrylin, a Director at London Economics International LLC, is an expert in the areas of regulatory economics, tariff design, electricity market design, and mergers and acquisitions. She is also very familiar with the regulatory environment and market rules in PJM, having worked on various projects in this jurisdiction spanning from assessing the investment opportunities in this market to modeling and forecasting the energy and capacity prices. Cherrylin has managed multi-million projects in North America and internationally: she led a team assisting the largest electricity utility company in Malaysia in its tariff regulatory proceeding; she led a high-profile project supporting the State of Hawaii, to assess the structure and function of the entire electric power sector in the state.

EDUCATION:

Institution	Columbia University
Date:	2005-2007
Degree(s) or Diploma(s) obtained:	Masters in International Affairs with a concentration in International Energy Management and Policy

Institution	Asian Institute of Management
Date:	1999-2001
Degree(s) or Diploma(s) obtained:	Masters in Business Management (full-time)

EMPLOYMENT RECORD:

Date:	July 2007-Present
Location:	Boston, MA
Company:	London Economics International LLC
Position:	Director (January 2020-present); Managing Consultant (April 2012-Dec 2019); Senior Consultant (July 2008- March 2012); Consultant (July 2007-June 2008)

Date:	Jan 2002 – June 2005
Location:	Manila, Philippines
Company:	USAID projects such as Philippines Climate Change Mitigation Program, Energy Environment Training Program, Energy Clean Air Program
Position:	Contractor/Consultant

Date:	August 2001-December 2001

Location:	Manila, Philippines
Company:	Philippines Climate Change Mitigation Program
Position:	Project Manager

Date:	November 1997 – June 1999
Location:	Manila, Philippines
Company:	Philippine Department of Energy
Position:	Executive Assistant IV to the Undersecretary

RECENT PROJECT EXPERIENCE:

Tariff design/PBR

Date:	June 2017 - current
Company:	Hawaii State Energy Office
Location:	US (Hawaii)
Description:	Cherrylin led a team studying utility ownership and regulatory models that apply to the utilities in Hawaii, and that will meet the state's energy goals. The Team looked at the technical, financial, and legal feasibility of these models in detail and conducted stakeholder outreach to gather the inputs of the different stakeholders. One of the regulatory models studied was incentive-based regulation. The team proposed three IBR options for Hawaii; the final deliverable was submitted to the legislature.

Date:	May 2016- March 2017
Company:	Utility
Location:	Malaysia
Description:	Cherrylin led a team to assist the largest electricity utility company in Malaysia in its amendments to the electricity tariff regulatory implementation guidelines ("RIGs"). The Team proposed enhancements to the RIGs and presented these proposals to the IBR Council composed of the utility's management team. The Team also presented its recommendations to the Commissioner on multiple occasions. Lastly, the Team amended the RIGs, and this was submitted to the Commission for approval.

Date:	May 2016- March 2017
Company:	Utility
Location:	Malaysia
Description:	Cherrylin led a team to assist the largest electricity utility company in Malaysia in its 2nd regulatory period performance-based regulation submission (2018-2020). The Team provided strategical advisory and reviewed the draft of the submission. The Team attended several meetings with the IBR Council and provided briefing sessions on various issues such as earning sharing mechanisms, ring-fencing, funding for innovation, etc.

Date:	2014
Company:	Private Client

Location:	North America
Description:	LEI was retained by a Canadian provincial government to serve as an advisor to its electricity system organization and governance. In particular, LEI was hired to analyze the emerging trends in utility governance, organization, performance, and accountability. Cherrylin is part of the team and wrote sections of the literature review on performance-based ratemaking. Cherrylin also managed the team that prepared the Comparator Industry Design and Regulation Report, which consists of some case studies on power market and governance structures. This report constitutes an analysis of global best practices and lessons learned based on both success and failures of some jurisdictions in restructuring and liberalization.

Date:	October 2015
Company:	TNB
Location:	Canada
Description:	Cherrylin conducted a 4-day workshop on Incentive-Based Ratemaking ("IBR") and accompanied the TNB delegation to a study tour. The team went to several Canadian utilities as well as utility commissions to learn about their experiences on implementing the IBR.

Date:	2013
Location:	Canada
Company:	Private client
Description:	Cherrylin was part of a team that prepared an expert report on different incentive rate-making frameworks for submission as part of gas distribution company ratemaking proposal. The report set out: the theory behind price and revenue cap frameworks including their strengths and weaknesses; included case study analysis on approaches in ten jurisdictions across Canada, the US, and UK; and quantitatively analyzed the impacts of different rate-making frameworks on the client's revenue streams. LEI's analysis' was filed with the Ontario Energy Board in July 2013.

Date:	2013
Company:	Private Client
Location:	Malaysia
Description:	LEI was retained by the largest electric utility company in Malaysia to conduct a workshop on incentive-based ratemaking ("IBR"). Cherrylin led the group in preparing the presentations for the workshop. The topics for the workshop include theoretical conceptual overview of IBR regulatory framework, key elements of comprehensive IBR regimes, best practices of IBR in various jurisdictions, timing and framework in other jurisdictions, how to convince regulators and stakeholders, identifying barriers to successful implementation of the IBR, and moving from first to second generation IBR, to name a few.

Date:	2012
Location:	Ontario, Canada
Company:	Ontario Power Generation

Description:	LEI was engaged by Ontario Power Generation ("OPG") to support senior management through regulatory processes related to performance-based rates. Cherrylin was part of a team that prepared a discussion paper on incentive regulation mechanisms ("IRM") currently in place in Ontario for electricity and natural gas distribution utilities and presented it at a technical workshop at the Ontario Energy Board ("OEB").

Date:	May 2011-2012
Location:	USA
Company:	Private Client
Description:	Cherrylin assisted the Principal in writing a testimony for a Canadian electricity utility in the context of its filing for a performance-based ratemaking ("PBR") plan. The testimony provides detailed data analysis (including inflation and TFP trends), underpinning PBR economic theory, and reviews of best practices in various North American and International jurisdictions. The testimony offers back up elements for each of the various components of the PBR plan that is being proposed by the client. Deliverables also included a series of memos on specific issues assisting the client with the preparation of its PBR plan proposal.

Date:	March-May 2011
Location:	USA, Canada, the Netherlands, UK, Australia
Company:	Private Client
Description:	Cherrylin was part of a team that prepared a white paper for Canadian electricity regulators and utilities on the comparative advantages and drawbacks of various tariff-setting regimes, from performance-based regimes to cost-of-service. This project involved a general overview of tariff-setting practices across Canadian provinces as well as highly detailed Canadian and international case studies and an examination of the key-lessons to be learned from each case. Detailed case studies covered the tariff-setting regimes in place in the UK, the Australian National Electricity Market and the Netherlands. As part of its deliverables, two workshops were conducted with a variety of regulators and utilities.

Date:	November-December 2010
Location:	Alberta, UK, Australia, Ontario
Company:	Private Company
Description:	For a Canadian client, Cherrylin prepared a report that looks into the different capital expenditure recovery mechanisms utilized by four markets namely Australia, New Zealand, Ontario, and the UK. The report also provided different options that the client can propose for its PBR filing.

Energy modeling/price forecasting/due diligence

Date:	October 2017
Company:	Private client
Location:	US (PJM)
Description:	LEI was retained by an infrastructure firm to provide the energy and capacity price forecasts for the firm's assets in New England and PJM.

Date:	June 2016
Company:	Private client
Location:	US (PJM)
Description:	LEI was retained by an infrastructure firm to provide 20-year monthly energy and capacity prices and operating metrics results for two new CCGT plants in PJM and one in SERC. LEI reviewed plant parameters, financial model, and market consultant reports provided by the seller and delivered price forecast and dispatch results to the client.

Date:	May 2016
Company:	Infrastructure fund
Location:	US (PJM)
Description:	Cherrylin led a team to analyze the PJM capacity market. The final deliverable was a PowerPoint presentation containing a comparison of LEI's forecast and the recent 2018/2019 Base Residual Auction results, as well as potential changes in the market that will impact future capacity prices.

Date:	January – February 2016
Company:	Private client
Location:	US (PJM)
Description:	LEI was retained by a generation company to prepare a 20-year energy and capacity price forecast for PJM. This is related to the firm's potential target to acquire a portfolio of hydro assets in SERC which looks to sell into PJM West.

Date:	Jan 2016
Company:	Private equity firm
Location:	US (PJM)
Description:	LEI was hired to provide analytical support on a private equity firm's due diligence process. Cherrylin provided an updated outlook on energy prices, as well as intelligence on recent developments in selected US power markets (PJM). She also assisted in forecasting the REC prices for the next ten years and reviewing the requirements and risk exposure to hydropower facilities in PJM.

Date:	January 2016

Company:	Private client
Location:	US (PJM)
Description:	The client was interested in acquiring a pumped storage hydro generation facility owned by LS Power in the PJM region. Cherrylin led the team that forecasted the energy and capacity prices for the next 20 years of the relevant zone for this target asset. LEI modeled both energy and capacity markets on an integrated basis, as well as used the Real Options Model to simulate the target unit's operational decision in arbitraging the peak versus off-peak hours in the energy market.

Date:	Jan 2016
Company:	Infrastructure fund
Location:	US (Pennsylvania and Ohio)
Description:	Cherrylin led a team in performing a 20-year energy and capacity price forecast in support of a potential acquisition of a planned gas-fired plant in Pennsylvania. The results will also be used to update the firm's valuation of its other plant in Ohio.

Date:	August 2015
Company:	Private client
Location:	US (New Jersey)
Description:	Cherrylin forecasted the potential energy, capacity, and solar renewable revenues for a solar plant in New Jersey using the firm's proprietary dispatch model.

Date:	June 2015
Company:	Private client
Location:	US (PJM)
Description:	LEI was retained to forecasts the revenues of a gas-fired plant in PJM for the next 30 years

Date:	April – May 2015
Company:	Private client
Location:	US (PJM)
Description:	LEI updated its PJM and NY energy and capacity forecast to facilitate private client financing.

Date:	2014
Company:	Private Client
Location:	North America
Description:	Cherrylin was part of a team that was looking at the price and macroeconomic impact of closing some nuclear plants in PJM. The project involved evaluating the continued operations of the nuclear plants on the energy market, assuming that some form of subsidies will be provided by the state. Through the use of its simulation model, POOLMod, LEI simulated the costs of power for consumers based on future market prices for energy and capacity (with the nuclear continuing to operate) under "baseline" or "business as usual" market conditions. LEI also looked at another scenario where the

	nuclear plants were prematurely shutdown. LEI analyzed how the closure of these nuclear plants affected the wholesale electricity and capacity prices in the state, and evolution of replacement resources, and the implications thereof on consumers' electricity rates.

Date:	2014
Company:	Private Client
Location:	North America
Description:	Cherrylin has led a team in forecasting the energy and capacity price forecasts in PJM as well as the potential revenues of a proposed gas-fired plant in PJM. The client was looking into acquiring the proposed plant located in Maryland.

Date:	2014
Company:	Private Client
Location:	North America
Description:	Cherrylin led a team that projected the energy and capacity revenues of a proposed gas-fired plant in Ohio. Cherrylin specifically led the modeling of the PJM market and prepared the powerpoint presentation for the client.

Date:	2014
Company:	Private Client
Location:	North America
Description:	Cherrylin was part of a team that performed due diligence for a hydro plant in PJM. Cherrylin performed an energy and capacity price forecasts for 20 years. Cherrylin also assisted the team in putting together a renewable energy credit ("REC") model to determine the long-term REC prices.

Date:	2014
Company:	Private Client
Location:	North America
Description:	Cherrylin led a team that prepared the long-term energy and capacity price forecast for the New York wholesale power market and annual revenue forecast for a hydro plant located in update New York. The report was used as part of the Confidential Information Memorandum for the sale of the hydro plant.

Date:	2013
Location:	United States
Company:	Private client
Description:	LEI was hired to review regulatory and market drivers of energy and capacity prices in PJM. Cherrylin led the team in forecasting the energy and capacity price forecasts in PJM as well as the potential revenues of a portfolio of pumped storage and conventional hydro generation facilities, over a 20-year horizon.

Date:	2010- current
Location:	PJM
Company:	Private Client
Description:	Primary modeler of the PJM market and prepares on a regular basis a ten-year energy and capacity price forecasting report for this market.

Date:	July-August 2011
Location:	PJM
Company:	Private Client
Description:	Provided energy and capacity price forecasting services for a waste coal facility located in the PJM regional market. Specific tasks include i) due diligence review of documents such as past financial statements, operational statistics report, fuel agreements and power purchase agreements (PPA); ii) forecasted energy and capacity prices in the PJM regional market; iii) prepared a final report documenting assumptions, methodologies used and modeling results.

Date:	September-October 2010
Location:	Philippines
Company:	Private Client
Description:	In supporting the bidder in buying a portfolio of global generation assets, 20-year of energy price forecasts were developed based on assumptions of macroeconomics, demands, fuel prices, and new entry and retirements. The energy price modeling was customized to take into the difference between dependable capacity and installed capacity. The modeling results served as direct inputs to financial valuation models of the bidder's agent investment bank.

Date:	April-June 2008
Location:	PJM
Company:	Private Client
Description:	LEI was retained to produce energy and capacity price forecasts for six U.S. markets. Cherrylin was the primary modeler for the PJM Interconnection region, providing an analysis of market dynamics and potential revenues to value electric generation assets.

Date:	March 2008
Location:	PJM
Company:	Private Client
Description:	For a Japanese utility, conducted an energy price forecasting (2009-2030) for PJM as well as the client's power plant in PJM. Aside from the base case, the report also included a scenario with the Regional Greenhouse Gas Initiative ("RGGI") program. Cherrylin was responsible for making the assumptions to the price forecasting, running the POOLMod simulation, and interpreting the results of the simulation.

Market design

Date:	2014
Company:	Private Client
Location:	North America
Description:	Cherrylin was part of a team that prepared a regulatory checklist for a client that was interested in making investments in the US. Cherrylin looked into the obligations of a power plant owner as well as filing requirements for FERC, NERC, and the Balancing Authorities. The checklist will be used for the client's future acquisitions.

Date:	2012-2013
Location:	United States/Europe
Company:	Private Client
Description:	Cherrylin was part of a team that outlined a strategic roadmap for the implementation of virtual power plant ("VPP") auctions. The paper set out the various decisions and potential options that exist for each decision in a conceptual roadmap for designing a VPP product and implementing a VPP auction. The paper drew on practical examples of VPP implementation from across the globe and adjusting these arrangements for the specific situation faced by the client.

Date:	Feb-May 2010
Location:	Alberta
Company:	Private Client
Description:	Cherrylin was part of a team that reviewed the different market design alternatives, the client's portfolio by 2020, and the client's competitors relative to the changes in the market by 2020. The paper also provided market strategies for the client given the likely market changes by 2020.

Date:	July – September 2007
Location:	Multiple locations
Company:	Private Client
Description:	Cherrylin was part of a team that analyzed the ancillary services products, trading arrangements, and procurement processes of several North American markets such as New York, New England, and Texas (ERCOT) as well as international markets such as UK, Australia, and Ontario. The ancillary services in Alberta were also studied as a background for comparison with the other markets. Cherrylin also identified the best practices in these markets that Alberta can explore. The results of this analysis were used to support the client in the stakeholder process to redesign a system operator's procurement process.

Transmission

Date:	2014
Company:	Private Client
Location:	North America
Description:	Cherrylin worked on a project where the team needs to conduct an independent modeling exercise to determine the potential revenues for a proposed transmission project wheeling power from western MISO to eastern MISO and eventually to PJM. The team evaluated both the revenue opportunities to the investors as well as the societal benefits to the MISO system. The team also assessed the incremental value of the business strategy of selling the energy (and capacity) out of East MISO to third parties who will serve customers in PJM. LEI's modeling exercise entailed evaluating intrinsic revenues, extrinsic revenues, as well as the green value of the project.

Date:	2013
Location:	US
Company:	Private client
Description:	Cherrylin led a team that is assessing the economics of the proposed Lake Erie HVDC transmission project and determining the additional revenue streams or value adders of the Lake Erie HVDC transmission project ("LEP") from the perspective of third-party shippers. The LEP is a 100-km long 1,000 MW bi-directional HVDC transmission line that will connect the Ontario energy market with the PJM market. LEI prepared a comprehensive report that includes a review of the Ontario and PJM markets, a 20-year (2017 to 2036) market outlook and prices for electricity, capacity and renewable energy credits in Ontario and the relevant zone/s in PJM; the total gross arbitrage value for the energy congestion rents, the capacity revenue potentials for PJM, and the renewable energy credits revenue potential in PJM.

Date:	2013
Company:	Private Client
Location:	North America
Description:	LEI was retained by a large US utility to provide a paper on California ISO's transmission economic planning process ("TEPP") and transmission economic assessment methodology ("TEAM"). Cherrylin was part of the team that reviewed the CAISO's regulations related to transmission planning and economic studies to evaluate transmission projects and co-wrote the paper describing CAISO's TEPP and TEAM with illustrative and quantitative examples.

Date:	2013
Location:	US
Company:	Private client

Description:	Cherrylin was part of a team that analyzed the viability of potential investment of a client in a proposed electricity transmission line in California connecting the South California Edison and San Diego Gas & Electric utility service areas in light of the state's electric transmission approval process, the relative feasibility of the project compared to proposed alternatives, and the increased need for electricity reliability in the LA Basin and San Diego region in the aftermath of the shutdown of the San Onofre Nuclear Generating Station.

Date:	2010-2012
Location:	United States
Company:	Transmission Developers, Inc. ("TDI")
Description:	Cherrylin was part of a team that looked at the detailed cost-benefit analysis and macroeconomic impact analysis in support of the Champlain Hudson Power Express ("CHPE") application for siting approval at the New York Department of Public Service ("DPS"). LEI's analysis of economic effects was the cornerstone of the settlement agreement reached between TDI and some New York agencies. Results of the modeling were filed with the Commission. The study is available on the client's website at http://www.chpexpress.com/docs/Analysis-of-the-Macroeconomic-Impacts-of-the-Proposed-CHPE-Project.pdf.

Date:	2010
Location:	Saudi Arabia
Company:	Energy and Cogeneration Regulatory Authority
Description:	Prepared a report on how to prevent abuse of vertical market power by transmission companies found in a holding company structure. This report shows that both the US and EU have developed affiliate relations codes to assure that transmission companies provide non-discriminatory access to all stakeholders, regardless of affiliation. The report recommends that based on international best practice, Saudi Arabia should ensure that the transmission company has a separate board from the holding company, does not share staff or premises, has separate accounts, has full transparency regarding transfer pricing, and has established codes of conduct.

Date:	October 2008 – August 2009
Location:	New England
Company:	Private Client
Description:	LEI was commissioned by a large utility company to evaluate the benefits of a proposed transmission project in New England. Cherrylin was part of the team that conducted a detailed hourly simulation modeling of future power market conditions to derive the potential market implications of the transmission line for ten years.

Market analysis

Date:	May 2017
Company:	Private client
Location:	US (multiple)
Description:	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.

Date:	Sep 2017
Company:	Infrastructure fund
Location:	US (multiple)
Description:	Cherrylin led the team in putting together a slide deck that includes a market overview, key drivers of the market, and recent developments of the following markets: PJM, New York, New England, ERCOT, and SERC.

Date:	July 2015
Company:	Law firm
Location:	US
Description:	Cherrylin led a team in doing a market power analysis for a potential acquisition of a portfolio of assets

Date:	July 2015
Company:	Asset management company
Location:	US (PJM)
Description:	LEI was retained by an asset management company to put together an independent market report on their portfolio of hydro assets in PJM

Date:	March 2014
Company:	Private client
Location:	US (PJM)
Description:	Cherrylin was part of a team that prepared a paper discussing how imports are treated in the capacity markets of NYISO, New England, and PJM.

Date:	2013
Location:	United States
Company:	Duke-American Transmission Company
Description:	Cherrylin was part of a team of economists that performed a macroeconomic analysis to estimate the local economic benefits accruing to taxpayers, residents, and businesses along the 800+mile route during construction of the Zephyr HVDC project, which runs from Wyoming to Colorado, Utah, and Nevada. LEI performed the analysis using the REMI P1+ model.

Date:	November 2007 – March 2008
Location:	Singapore
Company:	Private Client
Description:	Analyzed the electricity and gas markets of Singapore in relation to a client's bid for a generating facility. The analysis included a review of the coal market, liquefied natural gas market, and the carbon market in Asia. She also reviewed the retail market and the ancillary services in Singapore. In addition, she conducted due diligence on the current assets of the target company as well as evaluated its coal vs. gas repowering plans. Furthermore, she prepared a market primer on the Singapore electricity and gas markets for the client.

Date:	October – November 2007
Location:	Maine
Company:	Maine Public Utilities Commission
Description:	Cherrylin examined relevant studies performed by New England ISO, the Northern Maine Independent System Administrator, and the New Brunswick System Operator, and other applicable entities.

Date:	July 2007
Location:	Canada
Company:	Private Client
Description:	Cherrylin assessed the production, demand, storage, transportation, distribution, and marketing of natural gas in Canada. Recommended possible investment areas in the Canadian gas market.

Date:	February – April 2007
Location:	USA
Company:	Private Client
Description:	Cherrylin was part of a team that analyzed the project financing of an offshore wind project off the Dutch continental shelf. The team also evaluated the Dutch electricity markets, the impact of the government's subsidies not only on the specific project but to other future renewable projects as well.

Date:	July-August 2006

Location:	Alberta, Calgary
Company:	Private Client
Description:	Cherrylin appraised the Alberta electricity markets and part of the team that prepared an outlook on the wholesale Alberta electricity prices for the next fifteen years and implications for the company's three wind projects

Date:	June 2006
Location:	Canada
Company:	Private Client
Description:	Part of the team that reviewed and analyzed an investment portfolio for a client. The investments include assets in the power generation, power distribution, retail fuel, natural gas transportation, and natural gas distribution in emerging markets in Latin America and Asia. In-charge of conducting the market analysis of the electricity market in the Philippines and Jamaica and made recommendations on the viability of the assets.

Renewables

Date:	July 2015
Company:	Private client
Location:	US (New England)
Description:	Cherrylin led a team in reviewing House Bill 3968 (or An Act Relative to Clean Energy Resources) and providing insights as to the impact of the Bill on the client's long-term contracts.

Date:	2012
Location:	Saudi Arabia
Company:	Confidential client
Description:	Cherrylin prepared a report on the energy storage technologies. The report includes a discussion on (i) the different energy storage technologies such as pumped hydro storage, flywheels, compressed air energy storage, and batteries, (ii) applications of these technologies, (iii) economics of energy storage technologies, (iv) regulatory and legal issues, and (v) significance of energy storage to Saudi Arabia.

Date:	May-June 2010
Location:	New England
Company:	Maine Public Utilities Commission ("MPUC")
Description:	Cherrylin updated the LEI's Renewable Energy Credit ("REC") model for New England and forecasted the REC prices for class I resources for the next ten years (2010-2019), which was used to evaluate bids to the Maine PUC energy procurement.

Procurement

Date:	May – June 2008
Location:	Maine
Company:	Maine Public Utility Commission
Description:	Cherrylin drafted both the Term Sheet and the RFP for long-term contracting of supply resources for Maine. The RFP consists of the description of products being procured, the RFP process, requirements, and evaluation criteria.

Stakeholder engagement

Date:	April 2005
Location:	Manila, Philippines
Company:	Private Client
Description:	Cherrylin conducted the focus group discussions with the different stakeholders, the results of which were used for the communications needs assessment of the Philippine Rural Power Sector Reforms report submitted by a client to the World Bank.

Date:	July – September 2003
Location:	Manila and Cebu City, Philippines
Company:	Private Client
Description:	Part of the team that developed the communication and crisis strategy plan for the Cebu-Negros-Panay looming power crisis. This plan was adopted and implemented by the Philippine Department of Energy. Moreover, she was in-charge of the successful Power Summit held at Cebu City, Philippines.

Date:	June 2002
Location:	Manila, Philippines
Company:	Private Client
Description:	Cherrylin headed a team that conceptualized and conducted a series of follow-up public consultations on the implementation of the Electricity Power Industry Reform Act (EPIRA) in the Philippines.

Date:	October – December 2001
Location:	Manila, Philippines
Company:	Philippines Climate Change Mitigation Program

Description:	Cherrylin co-handled the nationwide public consultations for the implementing rules and regulations of the EPIRA. The ten nationwide public consultations were targeted for all the stakeholders of the power industry namely the industry players, consumer groups, business organizations, and concerned government agencies. Cherrylin was also part of the technical team that developed the program for the public consultations and submitted an integrated report of the results of these public consultations to the Philippine Joint Congressional Power Commission.

Barbara Porto

Consultant

LONDON ECONOMICS

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, and wholesale price analysis. Barbara is LEI's lead expert and modeler for the Mexico and Latin America markets and provides advisory services on a variety of topics touching upon all aspects of the power sector value chain. Barbara also serves as a key modeler for LEI's gas pricing model. She is a key ream member for LEI's management audit engagements.

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

EDUCATION:

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

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

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

EMPLOYMENT RECORD:

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

Date:	July 2008 – August 2013
Location:	Rio de Janeiro, Brazil
Company:	ENEVA (subsidiary of E.ON AG)

Position:	Analyst (July 2010 – August 2013) Intern (July 2008 – June 2010)

RECENT PROJECT EXPERIENCE:

Date:	July 2020 - present
Location:	USA
Company:	Louisiana Public Service Commission
Description:	**Audit of fuel adjustment clause for 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. 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 prudency and reasonableness of costs incurred for oil, gas, coal, and nuclear fuel and transportation, and an assessment operating performance of utility generating assets. Barbara was responsible for the fuel procurement sections of the report.

Date:	July 2020 - present
Location:	USA
Company:	Louisiana Public Service Commission
Description:	**Audit of fuel adjustment clause for Cleco Power** 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. 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 prudency and reasonableness of costs incurred for oil, gas, coal, and lignite; and transportation; and an assessment operating performance of utility generating assets. Barbara was responsible for the fuel procurement sections of the report.

Date:	January 2018 – January 2019
Location:	USA
Company:	Public Utility Commission of Ohio
Description:	LEI was engaged in 2018 by the Public Utility Commission of Ohio to perform a management/performance audit of the Alternative Energy Rider of the Ohio Power Company (AEP Ohio). LEI examined processes involved in procuring RECs and SRECs. LEI compared and benchmarked AEP Ohio RECs and SRECs costs and other operational results against data from public sources. LEI created a working model of the true-up process and provided quantitative results comparing the impact of quarterly versus semi-annual true-up periods on the utility and on ratepayers. Barbara performed

	analysis on RECs benchmarking, inventory, and compliance, as well as the cost of compliance and the approach used by AEP Ohio to calculate the cost of RPS compliance.

Date:	July – December 2018
Location:	New England, USA
Company:	Private Client
Description:	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.

Date:	June – December 2017; July – November 2018
Location:	MISO
Company:	Mississippi Public Service Commission
Description:	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 prudency 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.

Date:	July – August 2018
Location:	New York, USA
Company:	Private Client
Description:	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.

Date:	March – August 2018
Location:	USA
Company:	Private Client

Description:	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.

Date:	May – July 2018
Location:	Maine, USA
Company:	Private Client
Description:	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.

Date:	January – July 2018
Location:	USA
Company:	Maine PUC
Description:	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.

Date:	February – April 2018
Location:	USA
Company:	Columbia University Center for Global Energy Policy
Description:	LEI was engaged by the Columbia University School of International and Public Administration's Center on Global Energy Policy ("CGEP") to conduct econometric analysis of global oil (crude oil and key refined products) demand and its income and price drivers. Barbara conducted a portion of the econometric analysis using STATA and coauthored the report.

Date:	November 2017 – March 2018
Location:	USA
Company:	PacifiCorp
Description:	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.

Date:	August 2017
Location:	Canada
Company:	Private Client
Description:	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.

Date:	May 2017 – August 2017
Location:	USA
Company:	Private Client
Description:	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.

Date:	May 2017
Location:	USA
Company:	Private Client
Description:	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.

Date:	April 2017
Location:	USA

Company:	Private Client
Description:	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.

Date:	December 2015 – April 2017
Location:	Canada
Company:	Ontario Power Generation ("OPG")
Description:	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.

Date:	December 2016
Location:	USA
Company:	Private Client
Description:	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.

Date:	July – December 2016
Location:	USA
Company:	Private Client
Description:	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.

Date:	June 2016
Location:	USA
Company:	Private Client
Description:	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.

Date:	June 2016
Location:	Brazil
Company:	Private Client
Description:	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.

Date:	April – May 2016
Location:	Multiple
Company:	TransAlta
Description:	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.

Date:	March 2016
Location:	Canada
Company:	Alberta Balancing Pool
Description:	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.

Date:	October – November 2015
Location:	Multiple
Company:	Private Client
Description:	LEI was retained as part of a consortium to support an energy product manufacturing firm assess the market for solar thermal technologies, with a focus on an economic assessment of solar thermal technology, assessing the value contribution of the different components of the value chain creating a molten thermal solar plant. In addition, the client asked LEI to provide support to developing business strategies for this market. LEI's conducted the analysis in 3 out of 5 high priority markets - Saudi Arabia, Morocco, and Chile. More specifically we assessed the economics for solar thermal in each market, commented on the general perception of the technology and provided a comprehensive brief on the rules governing the market access. Barbara was responsible for the Chilean market.

Date:	June – October 2015
Location:	USA
Company:	Private Client
Description:	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.

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

Date:	May – June 2015
Location:	USA
Company:	Private Client
Description:	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.

Date:	April 2015
Location:	Colombia
Company:	Private Client
Description:	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.

Date:	March – April 2015
Location:	Colombia
Company:	Private Client
Description:	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. Barbara created the fuels forecast, assisted with research tasks for the modeling activities, and coauthored the report.

Date:	January – February 2015
Location:	USA, Canada and Mexico
Company:	Private Client
Description:	LEI was retained by a private client to conduct a mini-workshop to discuss the market opportunities and risks on five proposed transmission projects in the US and Mexico. Barbara was involved in the analysis of the Mexican projects.