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January 15th, 2015

Pamela Knotts
Public Service Commission
861 Silver Lake Blvd.
Cannon Building, Suite 100
Dover, De. 19904

Re: RFP for Consulting Services to Review Utility Standard Offer Service Electricity Procurement

Dear **Ms. Knotts**:

Please find attached London Economics International's ("LEI") proposal to Review Utility Standard Offer Service Electricity Procurement.

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

There are no actual or potential conflicts of interest for LEI in performing the contractual obligations contemplated in this request for proposals ("RFP"). LEI is not currently working for any other Delaware state entity, utility and/or investors in utilities operating in Delaware, or any of their subsidiaries. Futhermore, per PSC's requirement, LEI will perform all tasks under this contract within the United States.

LEI has identified three areas within the proposed contract which it would like to discuss further with the Public Service Commission. These areas are as follows: D. 7 f 3 (page 27); D. 7 s (page 30); and E1 (page 33).

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,

Amit Pinjani

Managing Consultant
E: amit@londoneconomics.com

Review of alternative electricity procurement processes for the provision of Delmarva Power's standard offer services

prepared for the State of Delaware Public Service Commission by London Economics International LLC

January 15, 2015

London Economics International LLC ("LEI") is pleased to submit this proposal to the Delaware Public Service Commission ("PSC") to assist with review of the procurement process for the provision of Delmarva Power's standard offer services. LEI is uniquely qualified for this role given its extensive experience in competitive sales processes, having designed, optimized, and managed procurement processes for regulators, governments, industrials, and utilities around the world. Moreover, LEI has extensive knowledge of electricity markets of the PJM region, including Delaware, having performed a broad range of services from asset valuation to price forecasts to procurement projects in the region over the last two decades.

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1 About London Economics International LLC

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

Figure 1. Selected LEI clients throughout the world

LEI is extremely well-qualified to assist the Public Service Commission because of four distinct areas of expertise: (i) we have direct experience serving as an independent monitor / evaluator of value for multiple procurement processes in other jurisdictions and have provided independent analysis regarding proposed approaches and methodologies, (ii) we understand the regional power market and challenges for Delaware and the PJM market more broadly, (iii) we have extensive in-depth modeling and analytical capabilities, and (iv), we understand the unique perspective and objectives of state regulators. We have worked with other regulators and have experience testifying on a variety of issues related to procurement, competitive markets, long term planning issues and cost-benefit considerations. A brief summary of our experience in each of the four areas is provided below.

- **Extensive experience assisting in the role of independent monitor / evaluator in a competitive procurement, utility RFP process, or resource acquisition activity in**

deregulated power markets. We have worked on energy procurement issues for wholesale market participants and regulators, and have a comprehensive understanding of the entire procurement process, from the initial phases of design and stakeholder consultation, through qualification, implementation, and bid evaluation. Our work in procurement process design and analysis spans the spectrum of wholesale and retail products, and includes engagements on unit-contingent contracts, energy-only block products, renewable energy certificates, full requirements service, stand-alone capacity products, and other energy-related instruments.

- **Expertise and experience in PJM regional wholesale power markets.** We have an in-depth knowledge of the supply-demand dynamics of the region's electricity markets and have access to a comprehensive set of power markets data that we routinely incorporate in our analyses, e.g., an assortment of third-party commercial databases (SNL Financial, Ventyx Velocity Suite, Bloomberg), EPA CEMS data, FRC EQRs, and bilateral pricing market data. We are aware of the unique challenges and issues that are prevalent in Delaware and PJM as we have been involved in numerous engagements in the region.

- **Experience deploying our proprietary production cost-based simulation model to forecast electricity prices.** We have over two decades of experience conducting independent forecasts of future energy prices and system dispatch using simulation modeling techniques and other analytics for power market analysis, cost-benefit studies, examination of local macroeconomic impacts from investment spending in-state, integrated resource planning and resource adequacy. We also have an in-depth knowledge of utility self-build options and approaches regarding how to analyze them fairly against third-party options.

- **Experience in supporting regulators in important wholesale power market strategies and/or utility resource RFP processes, including provision of expert witness testimony**. We have extensive experience in writing and advising on RFP design, power purchase arrangements and various financial agreements. We have also provided expert testimony in an assortment of cases both relating to the procurement of resources, and other matters. Our unique set of experiences allows us to understand both the supply as well as the procurement-side, which allows us to easily anticipate problems in the process.

Furthermore the following attributes allow LEI to provide a unique service offering to its clients:

- ***clear, readable deliverables*** grounded in substantial topical and quantitative evidence;

- ***internally developed proprietary models*** for price forecasting incorporating game theory, real options valuation, Monte Carlo simulation, and sophisticated statistical techniques;

- ***in depth knowledge of North American, and specifically of Delaware and PJM electricity markets,*** enables LEI to provide expertise regarding changes in market dynamics and implications to regulatory frameworks and environmental standards; and

- ***balance of private sector and governmental clients*** enabling the firm to understand the interface between regulatory frameworks, including compliance and business operations thereby providing practical and well-rounded advice.

2 Understanding of the engagement and proposed work plan

The Public Service Commission ("PSC") for the State of Delaware is seeking a consultant to provide information and analysis regarding alternative long-term electricity procurement options for Delmarva Power & Light Company ("Delmarva Power") to meet its Standard Offer Service ("SOS") residential and small commercial retail load.

Delaware's restructured electricity market provides electricity customers the opportunity to choose their retail energy supplier. Those customers who do not exercise their right are supplied in accordance with the Delmarva Power SOS offering. As of December 2014, Delmarva Power supplies approximately 307,000 electricity customers, including 267,000 residential customers.[1] Of the 267,000 residential customers, approximately 237,000 or 89% are supplied in accordance with the SOS offering. In addition to its SOS residential customers, Delmarva Power offers SOS to commercial and industrial customers under an SOS offering.

As the SOS provider in Delaware, Delmarva Power offers its customers a fixed price supply tariff inclusive of energy, capacity and ancillary service costs.[2] SOS retail tariffs have been relatively stable or decreasing since 2010, with a single increase in the summer energy supply rates from 2013 to 2014 during this period as shown in Figure 2.

Figure 2. Delmarva Power Retail SOS Rate

Source: Delmarva Power. Integrated Resource Plan. December 2014.

[1] Delmarva Power. Integrated Resource Plan. December 2014.

[2] LEI note Delmarva Power also recovers expenses related to administering the SOS and a reasonable retail margin allowance.

In accordance with the Electric Utility Retail Customer Supply Act (2006), Delmarva Power prepares and files an Integrated Resource Plan ("IRP") every two years with the PSC. The current IRP, published in December 2014, outlines Delmarva Power's energy procurement plans for its SOS customers for the proceeding 10 year period. As part of the planning process, Delmarva Power has set out the following objectives:

- Reasonable cost and price stability;
- Meet or exceed reliability standards;
- Obtain renewable energy through a diverse portfolio at reasonable costs;
- Implementing cost effective Demand Response programs;
- Meet energy efficiency goals; and
- Implement utilities sponsored energy efficiency programs.

Since 2006, Delmarva Power has adopted a competitive bid process for the procurement of all, or part of, its annual wholesale electricity requirements on behalf of those customers who are supplied as per the SOS offering. As part of this process, potential suppliers are required to bid for the provision of a "full requirements wholesale supply service" inclusive of: energy, capacity, transmission (other than Network Integration Transmission Services), and ancillary services amongst other things. These services are provided under a fixed price framework and passed through to consumers accordingly.

Potential suppliers submit bids for "blocks" of energy (approximately 50 MW in size) by service type which together reflect the total energy needs for that "tranche" and period. Specifically, bids are requested for the provision of electricity for four service types, Residential and Small Commercial & Industrial ("RSCI"), Medium General Service-Secondary ("MGS"), Large General Service-Secondary ("LGS"), and General Service-Primary ("GSP"). Two tranches, in November and February, are completed throughout the year with a third tranche included for a given year where required. This process results in approximately one third of the residential and small commercial load placed up for auction in any given year.

Depending on the service type, the energy procured throughout the competitive bid process will generally be for a term of between 12 months (MGS, LGS and GSP service types) and 36 months (RSCI service).

LEI note this approach, in one form or another, has been implemented by Delmarva Power for over 10 years. Several updates to the process have been implemented since 2005 with subsequent "Orders" released by the PSC in relation to Docket No. 04-391. The latest of which, Order No. 8642 in Docket No. 04-391, amended the procurement process and full requirements for 2015.

Despite various updates to the process there remain concerns regarding the high energy costs paid by customers in the state of Delaware relative to neighboring jurisdictions as highlighted in Order No. 8619 opening Docket No. 14-0283 pertaining to the review. Specifically the PSC note the efforts to date of Delmarva Power *"to secure lower energy costs for Delmarva Power customers over the past 14 years have resulted in overall electricity rates higher than the national average"*. Given the term in which the current process has been implemented the PSC motioned to open the docket seeking a broad review of the retail electricity supply prices and approaches

on behalf of Delmarva Power customers and consideration of long range alternative supply options.

The challenges faced by Delmarva Power in procuring energy supply at least costs are common across utilities and markets both in the United States ("US") and around the world. As a result there are a number of procurement formats and pricing mechanisms for the provision of electricity supply explored in economic literature and practiced in various markets around the world. Each of these approaches or mechanisms provides for both advantages and disadvantages in their application, and will often be bespoke to the market in which they are employed. Figure 3 below provides a sample of those auctions mechanisms adopted in North America.

Figure 3. Sample of auction mechanisms employed in different jurisdictions to procure supply

Jurisdiction	Product	Mechanism	Notes
Connecticut	Standard Offer Service	Pay-as-bid	There is no competitive bid process in Connecticut. Instead, suppliers receive payments based solely on their bids. Only the distribution utilities are regulated.
Illinois	Default Supply	Single clearing price	A descending clock auction was held in September 2006. The results deemed unsatisfactory and the auction mechanism was subsequently decommissioned.
Maine	Standard Offer Service	Pay-as-bid	Nine auctions are held annually for the territories of the three distribution companies in Maine and the three defined customer types (small, medium and large). In case of multiple supply contract winners, the price charged to final customers is a weighted average of the contract prices.
Massachusetts	Default Service (Before 2005 Standard Offer Service)	Pay-as-bid	Distribution companies procure supply contracts with third parties through a competitive process overseen by the regulator, The market regulator only approves the final rate to customers.
New Jersey	Basic Generation Service	Single clearing price	Two simultaneous auctions are held, one for large customers and one for small customers. The auction type is a descending clock auction.

Sources: World Bank. Electricity Auctions an Overview of Efficient Practices. (2011); Maine Public Utilities Commission; State of New Jersey Board of Public Utilities; Connecticut: Public Utilities Regulatory Authority; Massachusetts: Massachusetts Government – Executive Office of Energy and Environmental Affairs

Establishing an appropriate procurement process requires careful consideration of the dynamics of the market and the overall objectives set out by the PSC. In Delmarva Power's case the critical objective is to *"minimize the cost of procurement by efficiently and competitively allocating the responsibility to provide electricity to those who are at least cost"* over the long term. To achieve this objective there are multiple approaches or mechanisms available to Delmarva Power, including but not limited to:

- Ascending (open-bid multi round) vs sealed bid auctions processes;
- Pay-as-bid vs. clearing price payment mechanisms; and/or
- Private value vs. common value sales definitions.

Furthermore there are additional considerations which need to be taken into consideration as part of any procurement process including:

- Evaluation criteria in reviewing bidder's proposal;

- Assessing the extent to which offered pricing is economical, stable, and predictable over the offered contract term;
- Overall portfolio cost and risk, including project and financing risk (if applicable);
- Creditworthiness of bidders;
- Contribution to system reliability;
- Contribution to the overall reduction of electricity costs;
- Contribution to increasing overall capacity;
- Contribution to the diversification of the total number of electricity supply sources;
- Contribution to the diversification of physical locations of electricity supply sources; and
- Contribution to the diversification of fuel supply of electricity supply sources.

Exploring these options, or combination of options, and identifying what best suits the needs of Delmarva Power in serving its RSCI customer base requires first considering the products (for example baseload, intermittent, peaking or load following generation) required to meet forecast SOS RSCI load as well as the broader market dynamics within the Delaware and PJM power markets. The following sections outline LEI's approach to understanding these requirements, and market dynamics and the identification and evaluation of alternative procurement approaches available to Delmarva Power.

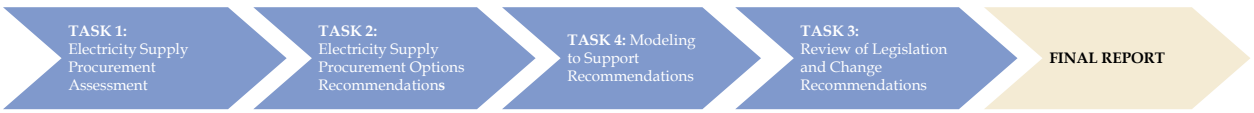
2.1 Assisting the Public Service Commission

In this section LEI outline a proposed scope of work based on the Public Service Commission's request for proposal ("RFP") of December 9, 2014. As per the RFP, LEI's work plan follows the four key tasks documented by the Public Service Commission. LEI note that Task 2 and Task 4 are complimentary and will therefore be completed in conjunction with one another. This will provide for both a quantitative and qualitative assessment of the proposed alternative procurement options for Delmarva Power.

We expect the activities required to conduct each task to include research, review, data collection and analysis, modeling of procurement outcomes and sensitivity analysis of the proposed alternatives for residential and small commercial customers. Throughout the review, LEI will rely on publicly available data, and where information is not public, LEI would seek data to be provided by the Public Service Commission, including but not limited to historical SOS bidding results (including prices and auctioned blocks / tranches), process documentation (including auction objectives), and forecast procurement needs.

The following sections discuss the work plan (and deliverables) as shown in Figure 4, as well as LEI's approach and modeling methodology to identifying the potential benefits and costs. LEI note the work completed under Task 4 (per the RFP) will be completed concurrently with Task 2.

Figure 4. Proposed work plan



2.1.1 Task 1: Electricity Supply Procurement Assessment

2.1.1.1 Review of existing approach, outcomes and Delaware market dynamics

To begin the assessment, LEI will review the State of Delaware's existing retail load profile with a specific focus on those residential and small commercial customers who remain under the SOS contract. This assessment will include review of forecast retail load over the short, medium and long term by customer category, as well as identifying the potential impacts of demand side management ("DSM") and energy efficiency ("EE") initiatives. This will help establish the wholesale energy supply requirements for Delmarva Power going forward. To understand the forecast retail load for SOS customers, LEI will initially rely on the information presented in the latest Delmarva Power IRP published in December 2014. This IRP presents Delmarva Power's procurement plans for its SOS customer base for the 10 year planning period 2015–2024. LEI will complete a high level review of the assumptions underpinning the forecast and where appropriate, incorporate those assumptions into its assessment of alternative procurement approaches.

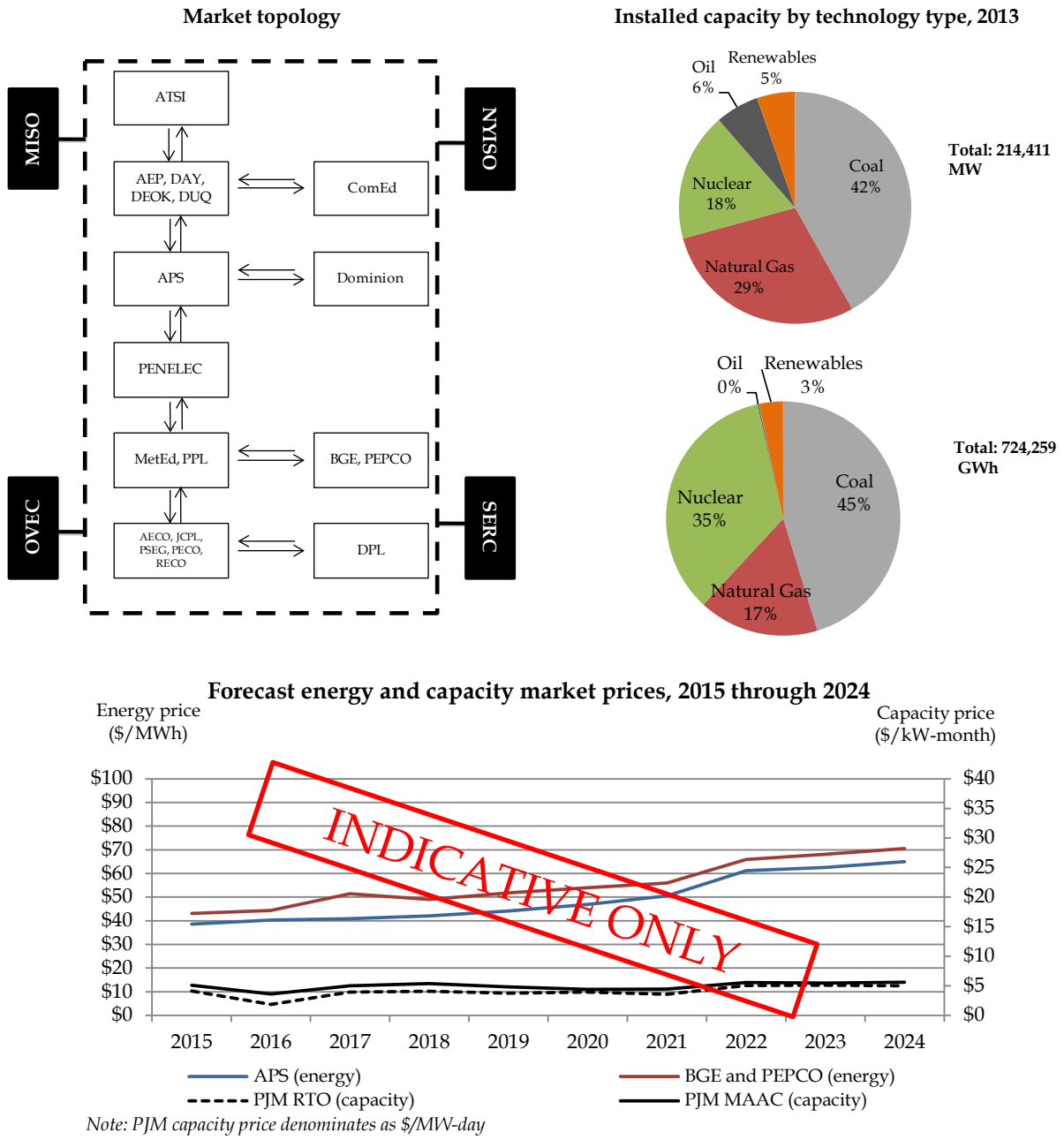
In addition to this assessment, LEI will review the existing contracted wholesale electricity supply including, but not limited to the number of, and diversification of suppliers, product types procured (for example baseload, intermittent, peaking, or load following generation) and term of contracts, current contracted "full-service" wholesale energy supply costs, and additional renewable energy certificate costs (where appropriate). LEI will review the wholesale energy supply costs against its own proprietary forecast of market prices in the PJM market, taken from its semi-annual market price forecast for Quarter 1 2015,[3] as well as those prices utilized in drafting the Delmarva Power IRP. Figure 5 presents a snapshot of LEI's previous modeling of the PJM market.

This assessment will establish a base case/status quo from the current approach which will be used to assess alternative procurement options available to Delmarva Power under Tasks 2 and 4 described below. In addition to establishing a base case, LEI will review and comment on the key objectives of the procurement process.

Having given consideration to the market dynamics facing Delmarva Power and historical results under the base case, LEI will then proceed to review the current procurement process currently adopted annually in accordance with Docket Number 04-391. As part of this review, LEI will identify the methodology, frequency, information management, systems and costs associated with the process against the base case results. Further LEI will review the independent consultant reports on the outcomes of the procurement process. Here, LEI will provide comment on the current strengths and weaknesses of the process and where appropriate, adjustments that may be made in order to strengthen the process to better achieve the desired results.

[3] This forecast is currently in production and will be released to the market in February.

Figure 5. Snapshot of LEI's PJM market wholesale energy price forecast



2.1.1.2 Literature and case study review: Procurement approaches adopted across North America

As noted earlier, topics such as auction theory are covered extensively in economic literature and empirical analysis. LEI will conduct a literature review covering key areas related to the proposed study. As part of this process, LEI will provide a theoretical understanding of alternative approaches, for example ascending vs. sealed bid auctions and clearing vs. pay-as-bid pricing mechanisms. LEI will critically analyze the strengths and weaknesses of each of the

approaches in relation to the Delaware market. LEI will focus not only on studies in the electric industry but also give consideration to other infrastructure industries where relevant. LEI will use its existing industry knowledge as a starting point to perform a more in-depth review of relevant literature. LEI keeps abreast of current developments and research in the electric power sector.

As part of this task, LEI will proceed to review the procurement approaches adopted across other North American jurisdictions via a series of case studies. Together these case studies will provide for a comparative assessment of the alternative methodologies available to Delmarva Power. LEI will focus its case studies on those restructured markets across North America ensuring for comparability to the Delaware market. LEI will also give consideration to the SOS procurement processes completed by Delmarva Power and Pepco for customers in Maryland and the District of Columbia.

In building each case study, LEI will detail the scope and objectives, products procured, methodology (including timing, information requirements, systems, and evaluation criteria), and costs of the alternative approaches. Research will also cover numerous contextual aspects including, but not limited to, the following areas:

- Fast facts about the electricity market structure;
- Legal and regulatory regimes supporting the procurement and where applicable regulatory and monitoring arrangements;
- Rationale for specific procurement elements and constraints taken into account;

Finally, LEI will document the benefits and costs (success and challenges) of selected approaches, and key takeaways for Delmarva Power.

2.1.2 Task 2: Electricity Supply Procurement Options Recommendations

As noted previously, Task 2 and Task 4 (as indicated in the RFP) will be competed concurrently as part of the overall assessment of alternatives. Through completing each of these tasks, LEI will provide for a qualitative and quantitative assessment of the potential costs and benefits of implementing each approach.

Having identified those alternative approaches adopted by Delmarva Power's peers across jurisdictions, LEI will proceed to further assess the benefits and costs in the context of their application in the Delaware market.

To begin, LEI will first establish an evaluation criterion in conjunction with the PSC. These evaluation criteria will focus on key objectives for the PSC and may include (but not be limited to);

- cost (relative to an appropriate benchmark) and price stability achieved;
- contribution to planning and reliability standards;

- diversification in suppliers, products and technology / fuel types; and
- implementation requirements (including changes to the legislative and regulatory framework, timing and complexity).

Subsequently, LEI will outline and seek approval from the PSC on a standardized evaluation structure to ensure the comparability between each approach.

Following the evaluation, LEI will present to the PSC a range of alternative approaches which may be adopted by Delmarva Power, providing for a recommendation on the options available. This range will highlight the applicable features of each individual approach, expected benefits and costs (see section 2.1.4), perceived transitional challenges or risks associated with their implementation and potential remedies to be adopted. Finally LEI will outline the overall impact to residential and small commercial customers of Delmarva Power.

2.1.3 Task 3: Review of Legislation and Change Recommendations

Having identified and made a recommendation of potential changes to the procurement approach to be adopted by the Delmarva Power, and communicated and gained buy-in from the PSC over that recommendation, LEI's team of experience regulatory economists will detail those areas of the legislative framework (Acts, Regulations, Codes and Guidelines) which may require amendment, or additions to, in order to reflect the approach recommended. Legislation covered under the review may include, but not be limited to:

- Electricity Restructuring Act of 1999, House Bill 10;
- Electric Utility Retail Customer Supply Act (2006)
- Delaware's Administrative Code
    - Title 26 Public Utilities – 3000 Energy Regulations
- Delaware Code
    - Title 26 Public Utilities – Chapter 10 Electric Utility Restructuring

Furthermore, LEI will assist the PSC in the drafting of subsequent orders and dockets to reflect amendments to the statutory/legislative framework to reflect the proposed procurement framework as reviewed and agreed with the PSC.

2.1.4 Task 4: Modeling to Support Recommendations

As noted earlier, following identification of plausible alternative procurement options for Delmarva Power and as part of the evaluation of those alternatives, LEI will model both the historical implications of their implementation, as well as their likely costs and benefits in future years. LEI will develop a specific model in Microsoft Excel, reflecting the nature of the proposed approach and the underlying assumptions. As part of this process LEI will where possible, assess the procurement outcomes relative to the historical wholesale energy procurement costs and energy spot price outcomes in the PJM market.

A key input and benchmark for this process will be a forecast of wholesale electricity supply prices in the PJM market. For this, LEI will rely on its proprietary simulation model, POOLMod, and specifically its semi-annual market price forecast and update for Quarter 1 2015 developed as part of LEI's Continuous Modeling Initiative. This forecast provides wholesale energy prices across the PJM market for a period out 20 years.[4]

LEI note, in the case of certain approaches such as multiple bid auctions, the actions of market participants, specifically the bidding behavior, for a given auction (or product) cannot be forecast with a given level of certainty. In this case LEI will develop simulation models which will incorporate the economic theory of the proposed approach as well as underlying assumptions which may be modified throughout the testing process. Further, where available, LEI will review the bidding behavior of known participants in the Delaware market, whom have participated in similar procurement processes to assist in understanding the potential behaviors of respondents under alternative procurement approaches.

2.2 Deliverables

As part of the engagement, LEI envisage four deliverables to be provided to the PSC over the course of the engagement. These deliverables will consist of the following:

- D1: Briefing Memo on literature review and case studies (delivered after completion of Task 1)
- D2: Excel model(s) accompanied with a briefing memo of alternative procurement approaches (delivered after completion of Tasks 2 and 4)
- D3: Briefing memo summarizing review of current legislative requirements and recommendations of changes (if any) that may be needed (delivered after completion of Task 3)
- D4: Final Report – consolidating previous deliverables and feedback from the PSC (delivered after completion of all tasks)

Deliverable 1 (D1) will be a briefing memo (in Microsoft Word or Powerpoint format) providing a summary of LEI's review of the current procurement methodology, perceived strengths and weaknesses, as well as a snapshot of the approaches adopted in other markets and a summary of economic literature reviewed. This deliverable will be provided to the PSC upon completion of Task 1.

Deliverable 2 (D2) will be a Microsoft Excel model and a briefing memo of the various approaches considered and recommended as part of the review process. The model(s) will be transparent and simple to use and offer PSC staff the ability to adjust the modeling assumptions and thereby results in order to better understand the alternative approaches available to Delmarva Power.

[4] Further details regarding LEI's proprietary simulation model are provided in section 6.

Deliverable 3 (D3) will be a briefing memo outlining LEI's review of the existing legislative framework providing a summary of the necessary changes required to the framework in order to implement the recommended approach.

Deliverable 4 (D4) will be a comprehensive report consolidating the overall findings from the review. This report will summarize the procurement approaches adopted in other markets, strengths and weaknesses of the approaches and their application to the Delmarva Power and the Delaware market specifically. LEI will outline the benefits and costs to residential and small commercial customers, and provide a recommendation for implementing an alternative approach (where appropriate). Furthermore LEI will outline perceived implementation challenges or risks of the approach, and identify the necessary changes to the legislative frameworks in Delaware required to implement a given approach.

3 Selected Relevant Experience

In this section, we have hand-picked a sample of projects highlighting our experience relevant to the present engagement. LEI has performed extensive consulting and advisory work across North America and the world, supporting clients in competitive sales processes, having designed, optimized, and managed procurement processes for regulators, governments, industrials, and utilities around the world. Moreover, LEI has extensive knowledge of electricity markets of the PJM region, including Delaware, having performed a broad range of services from asset valuation to price forecasts to procurement projects in the region over the last two decades.

3.1.1 Competitive procurement process experience

LEI team members have advised on the competitive procurement of energy for governmental entities, industrial actors, as well as electric utilities, independent power producers and energy merchant firms. Under many cases, the advisory role started at the initial stages of RFP design and contract drafting. In many of these projects, quantitative analysis of the bids and selection of the winning bids were part of our mandate. Team members have also advised on the advantages and disadvantages of various auction formats for the sale of electricity contracts and other derivative instruments, as well as the sale of physical assets.

- ***Designed procurement process for CT DPUC to reduce costs of congestion for CT ratepayers:*** LEI is currently engaged by the Connecticut Department of Public Utility Control ("DPUC") to assist it in the evaluation of measures to reduce Federally Mandated Congestion Charges ("FMCC") in the State of Connecticut. As part of this effort, LEI is performing an economic evaluation of the New England and Connecticut energy markets using its proprietary production cost model, POOLMod. In addition, we are also separately modeling the proposed locational capacity market and the recently approved locational forward reserves market. LEI is also designing and drafting the RFP process, RFP documentation, and contract template in order to best meet the needs of the DPUC and Connecticut ratepayers, using an innovative approach that will incorporate a hybrid physical and financial contract. LEI will be managing the procurement process, and will evaluate project bids in comparison to anticipated market outcomes over the next 15 to 20 years had no or little investment occurred.

- ***Supported Ontario Power Authority in improving procurement processes:*** LEI acted as an outside consultant to the Ontario Power Authority during a stakeholder process designed to improve future competitive procurement processes held by the organization charged with ensuring adequate generating capacity in Ontario. LEI advised the OPA on the development of questionnaires sent to stakeholders, participated as an observer in a series of public and private consultations with stakeholders, including developers, major power users, system operators and local distribution companies. LEI also prepared a final report that synthesized the comments made by the various stakeholders into a coherent format, and made recommendations to the OPA about ways to improve future procurement processes.

- ***Supported a Canadian ISO develop an effective competitive procurement process for the sale of dispatch rights associated with key generation assets:*** LEI provided advice on the

selection of the type of sale process for strip contracts associated with key generation assets; the choices considered included a sealed-bid option (i.e., a bank mediated private sale) or some type of open auction process based on both theoretical (economic) and practical (implementation) considerations.

- ***Experience analyzing and assisting in the negotiation of supply options for a large industrial customer in South Eastern US:*** LEI was engaged by a large industrial customer to help review of power purchasing options at one of its Southeastern facilities over the next three years. We assessed the probability of a supply interruption over the next three years due to the state of the transmission system in this region. We also assessed the facility's options for purchasing power for this load in the wholesale market.

- ***Assessed auction formats and outcomes in function of regional market dynamics:*** LEI researched and monitored auctions of supply obligations and sales of virtual capacity (such a Alberta's MAP II auction of dispatchable rights) on behalf of US investors looking at investment opportunities in similar transactions internationally. We provided detailed qualitative and quantitative analysis of auction outcomes compared to relevant regional market dynamics.

- ***Support to the California Energy Commission on topic of information disclosure in context of procurement:*** LEI prepared a series of reports, filings, and testimonies to support the California Energy Commission's petition to the California Public Utilities Commission ("CPUC") to force additional disclosures about future expected demand conditions by the state's investor owned utilities: Southern California Edison, San Diego Gas & Electric, and Pacific Gas & Electric. Part of this analysis entailed a detailed assessment of RFP processes in California for retail load, and considered the benefits of certain information release policy in creating investment signals and lowering effective costs of supply. LEI staff provided direct written and oral testimony and rebuttal Pennsylvania PUC.

- ***Design and Negotiation of Power Purchase Agreements for Hydro-Electric Resources:*** Assisted with the design and negotiation of power purchase agreements for hydro-electric generation resources. Primary role was to develop incentive mechanisms to promote shifting of output into on-peak periods and efficient cost management under the quasi-regulatory contract structure.

- ***Designing large scale renewable energy procurement program:*** LEI was engaged by a large Middle Eastern country's government to develop a recommended design for renewable energy competitive procurements, a feed-in tariff program and a sustainable energy procurement company. Across all of the modules, LEI led a multi-faceted on-the-ground team consisting of industry experts, economics, financial analysts, engineers, and legal advisors. Project includes extensive coverage of solar and wind. All activities completed were organized within Modules:

    - Competitive Procurement Module: LEI structured a procurement process using global benchmarks, while taking into account the local context (addressing legal, operational, technical, and financial aspects). LEI also identified appropriate capacity

targets for renewable energy (from a variety of technologies) given energy mix targets, within a designated timeframe.

- Sustainable Energy Procurement Company Module: LEI developed the design for a credit qualified counterparty to secure energy contracts in the competitive procurement process, and to cover the financial requirements that arise from the FIT program. The entity will evolve to domestically interface with relevant authorities, regulatory bodies, and the national financial infrastructure.
- Procurement Leverage Strategy ("PLS") Module: LEI designed a strategy consisting of four key elements: local content incentives and requirements on sustainable energy project developers, establishment of developer driven and co-funded training programs, creation of developer advised research and development initiatives, and job localization benchmarking and incentives. The PLS, which we refer to as a 'balanced acceleration' strategy, was carefully designed to balance the need to encourage local participation against the risk of rent seeking behavior.

- ***Review of roles and activities of regulators in auction processes:*** LEI was requested by the Ontario Energy Board ("OEB") to provide a report describing the roles and activities of regulators in other jurisdictions that have power and/or load auctions that set default, or standard offer, service prices. The research report extracted relevant examples of regulatory practices and policy that could serve as a guide to developing an OEB policy with respect to power and/or load auctions.

3.1.2 Experiences as Independent Evaluator/Monitor

LEI has served as Independent Evaluator/Monitor in numerous procurement projects. Through these assignments we are well aware of current industry standards associated with the evaluation criteria applied in competitive solicitations, the quantitative methodologies used by utilities to evaluate bids, current contract issues, and recent initiatives in the bidding area which have been designed to respond to the current financial situation in the power industry. Moreover, through these assignments we have reviewed and evaluated hundreds of power supply and DSM proposals encompassing a range of technologies, fuel types, and contractual structures. Technologies evaluated have included gas-fired combined cycle and gas turbine projects, coal gasification options, pulverized coal and fluidized bed projects, wind, biomass, geothermal, landfill gas, solar, and hydroelectric projects. Below are some of our engagements.

- ***Independent Evaluator to Pacific Gas and Electric***: LEI was part of a pool of consultants to the Pacific Gas and Electric Company's Independent Evaluator to monitor long-term resource solicitations that may involve affiliate, utility-owned or utility-turnkey bids and for all competitive solicitations seeking products greater than two years in length. Specifically, LEI worked with PG&E to ensure that Offers were evaluated consistently and appropriately in accordance with the solicitation protocol and in accordance with applicable rules and processes of the California Public Utilities Commission ("CPUC"). The following activities were performed by LEI team:
    - Review and comment on the fairness and appropriateness of PG&E's evaluation methodology.
    - Review and report on whether PG&E fairly administered and implemented its evaluation methodology.

- Review and report on whether the outreach that PG&E conducted to potential natural gas storage industry participants (Participant) was adequate and whether the solicitation was robust.
- Identify whether any Participant in the RFO received undue information or failed to receive due information, that advantaged or disadvantaged a Participant unfairly.
- Provide to PG&E, PG&E's Procurement Review Group ("PRG"), and the Energy Division of the CPUC presentations of the IE's findings. Participate as needed in any PRG and/or supplier meetings or teleconferences concerning this solicitation.
- Prepare the IE report for inclusion in any Advice Letter filings.
- Be available to testify as an expert witness in any CPUC proceeding regarding review of potential natural gas supply transactions arising from the RFO; if appropriate, prepare direct and rebuttal testimony, respond to data requests, and perform other activities required to testify as an expert witness.

- ***Served as independent monitor on behalf of the Utah Public Service Commission:*** LEI was part of a consortium serving as the independent monitor on behalf of the Utah Public Service Commission ("UT PSC") for a PacifiCorp renewable solicitation process. This process included: review of the solicitation process, documents, and modeling methodologies; monitoring, auditing, and validation of bid evaluation process; bid evaluation; and contract negotiation.

  Final report and testimony were filed with the UT PSC [Public Utility Commission of Oregon, Docket No. UM1368].

- ***Evaluation of long term energy procurement on behalf of the Maine Public Utilities Commission ("MPUC"):*** LEI assisted MPUC in evaluating a Long Term Contract. The project included multi-phases. In the first phase, LEI developed performance benchmarks and the bid evaluation model, in effect the projection of a "baseline" forecast of energy, capacity, and if needed, REC prices, against which the submitted bids would be evaluated. In addition to price, and at the option of the MPUC staff, LEI also developed additional, appropriate metrics for scoring the bids, which may have included reduction in volatility, reduction in prices to ME consumers, offset transmission costs, environmental benefits (such as RECs), as well as reliability benefits. The second phase involved actual bid evaluation, using the model from the first phase. Only bids short-listed by the MPUC will be evaluated. The third and final phase involved aiding the MPUC staff in contract negotiations as required.

- ***Acted as the fairness monitor for Ontario Power Authority's ("OPA") evaluation of "launch period" Feed-in Tariff applications:*** The team aided in the design of the evaluation framework and provided on-going support during the evaluation process. LEI prepared a final report that outlined LEI's opinion as to the fairness of the overall process. This report is not public, but is available within the OPA.

- ***Evaluated applications to the Aboriginal Renewable Energy Fund -*** As part of this role, LEI was responsible for independently evaluating applications received. A stand-alone due diligence report was prepared for each application. In addition to a general description of the project, the reports provided a review of:

- the eligibility of the project under the Feed-in Tariff (FIT) program;
- grid connection opportunities and issues;
- property and resource control;
- management capabilities and experience;
- resource availability (e.g. wind speed, solar irradiance, fuel, etc.);
- technology and equipment considerations; and
- financial and economic considerations.

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

- ***Served as an independent monitor for Entergy New Orleans:*** LEI was engaged to act as the independent monitor for Entergy New Orleans' solicitation of a Third Party Administrator to implement and deliver conservation and demand management programs on behalf of the utility. LEI oversaw the bid receipt, as well as the review and selection process. A final report was provided outlining the fairness of the overall process.

- ***Served as auction monitor for CT DPUC Transitional Standard Offer:*** LEI was hired by the Connecticut Department of Public Utility Control (DPUC) to oversee the Transitional Standard Offer (TSO) auction by Connecticut Light and Power (CL&P) for its load (more than 5,000 MW peak demand) in 2005 and 2006. The scope of the project included approving the RFP and communication protocol, participating in all bidder calls and negotiations, analyzing the New England market and developing scenarios for likely bids, and verifying CL&P's decision-making process for selecting winning bids. LEI also provided testimony to the DPUC based on its assessment of the auction process and its accordance with DPUC principles of competition.

3.1.3 Experience in the PJM market

In addition to the above procurement experience, LEI has completed multiple engagements in relation to the PJM market including forecasting wholesale energy prices, assessment and due diligence of investment in various generation assets. The following provides a sample of LEIs PJM related experience.

- ***Review of credit issues in the PJM power market:*** LEI prepared for an Australian industry consulting group a series of papers analyzing credit issues for power sector investors. These papers included an analysis of the PJM market (performance and overview), an overview of the US regulatory environment (breakdown of regulator roles and responsibilities), and an analysis of potential power sector instability based on performance issues experienced in US markets such as California.

- ***Due diligence and contract negotiation for coal fired power station in the PJM market:*** LEI led a due diligence team and assisted in the exclusivity negotiations with respect to an acquisition of a 400+ MW coal fired plant in the PJM market by a group of private investors. LEI conducted economic appraisals, coordination of preliminary technical due diligences, negotiations with third parties on possible off take arrangements, and oversight over financial modeling. The analysis included long term fuel and electricity prices, plant

emissions and current and forecasted emission prices, and reviewed relevant environmental regulations on NOx, SO2, and mercury emissions and their impacts on plant operations.

- ***Assessment of market power implication in the PJM Market associated with proposed power generation transactions:*** LEI supported a major Canadian investment firm in its acquisition of several power generation assets located in the PJM energy market. LEI successfully demonstrated to FERC that the client did not possess market power in PJM as a result of the proposed transaction.

- ***Energy and capacity price forecast for the PJM market:*** LEI was engaged by a Canadian industrial conglomerate to perform a low energy case scenario for PJM for the next 10 years (2013-2022). The deliverables included a summary of the market's energy and capacity prices and a final report that provided an overview of the recent market developments; assumptions used, and forecasted energy and capacity prices.

- ***Real options analysis and peaking power station valuation:*** LEI was retained by a global investment firm to conduct an independent assessment of the indicative value of a peaking plant in PJM using real options techniques. The objective of the case study was to communicate the importance of a real options tool in the financial valuation of generation assets, especially peaking plants and hydro-based plants, because traditional valuation procedures ignore the value of flexibility and uncertainty. LEI provided an indicative valuation for a 44 MW plant in PJM, using real options techniques, and the resulting value of the option embodied in this peaking plant under two different cases.

- ***Due diligence and market analysis for hydro power stations:*** LEI was retained to perform a due diligence and market study for three hydro units in PJM. LEI's tasks included reviewing the merchant prices and REC prices, evaluating the power purchase agreement and capacity charges and providing energy, capacity and REC forecasts.

- ***Post-PPA strategy development and assessment:*** LEI provided advice to a major Japanese power utility on the client's post-PPA strategy with regard to a facility that faced four alternatives upon expiration of its PPA: continue operation as a merchant facility, seek a new PPA with its current offtaker, repower or refurbish the facility, or cease operations. This report was one of three work products associated with the topic. A previous paper focused on examples of end-of-PPA decisions at other existing plants, and a companion paper to this one focused specifically on the updated base case modeling of future wholesale power prices in Western New York.

- ***Peak and Off-Peak price assessment for PJM Classic region:*** LEI was retained by a US industry advocacy group to provide a comprehensive study estimating the monthly peak and off-peak price-cost markup index in Day-Ahead Locational Marginal Prices ("LMPs") for the PJM Classic region over the period January 2003 through July 2006. The main task for the study was to estimate the effective energy prices assuming generators are offering their output at short-run marginal costs ("SRMC"). Once short-run marginal cost-based prices were estimated, they were then compared against historical LMPs and a price-cost markup index was calculated for different periods within the study timeframe. In order to capture locational as well as time-based trends in price-cost markups, the modeling explicitly

recognized and considered the market separation that occurs within a market area due to internal transmission congestion.

- ***Energy price forecasts and review of key market dynamics in the PJM market:*** LEI completed for a Canadian industrial conglomerate a five-year energy price forecast for the PJM West/ PJM Classic power market to determine the impact of key market drivers on peak/off-peak price dynamics in support of Brascan's evaluation of a pumped storage facility located in VACAR, adjacent to PJM West. LEI's team constructed six marginal cost-based scenarios and a strategic bidding-based case to test the sensitivity of peak and off-peak prices to gas and coal dynamics - two of the key market drivers in the short-run.

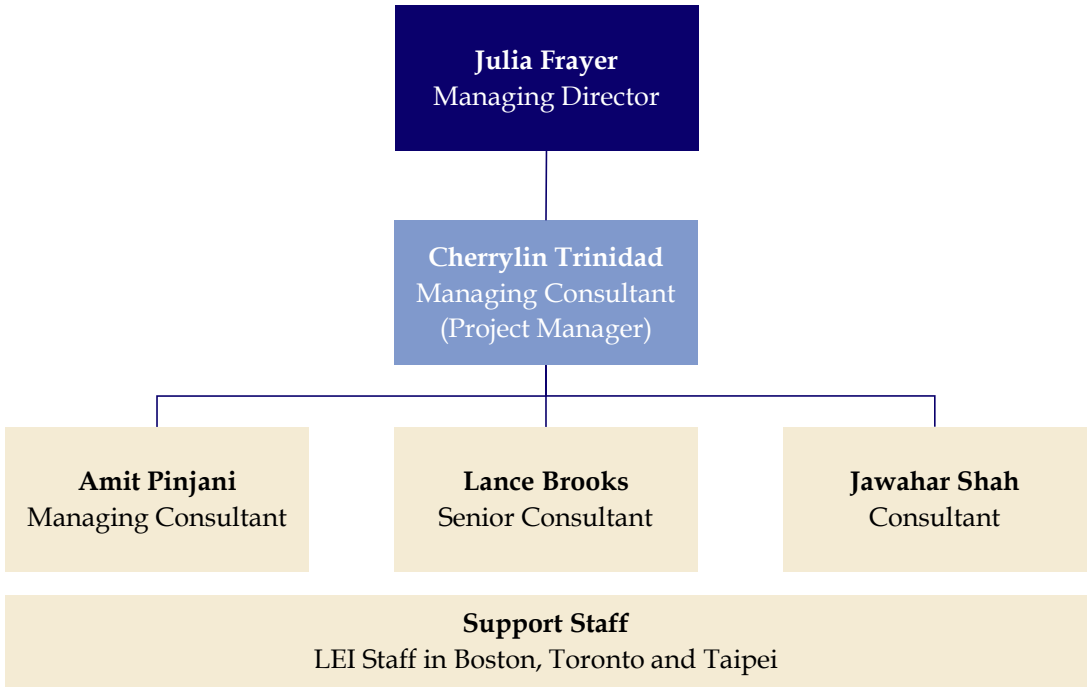
- ***Review of implied premiums of power source from wind generation:*** For a clean renewable energy company focusing on hydropower and hydro pumped storage, LEI assessed the implied premium attached to power produced from wind in Western PJM. Implied wind premium is the difference between the actual price paid for wind power (usually fixed power purchase agreement ("PPA") price) and the market-implied value of that power (locational marginal pricing in a given hour). Therefore, it varies by season, day, and hour. The team calculated a range of implied wind premiums, based on data about pricing of recently-signed wind PPAs, hourly wind output and spot energy prices across Western PJM zones.

4 Proposed Project Team, Schedule and Budget

LEI has gathered a select team of dedicated professionals with the required qualifications to support the Public Service Commission staff in identifying alternative long term procurement approaches to satisfy electricity demand. The team possesses considerable global energy markets expertise and technical, evaluation and strategy experience.

LEI Principal and Managing Director, Julia Frayer will be Project Lead and manage the team's work flow. Julia will convey the team's findings and oversee the development all deliverables. Julia will be supported by Cherrylin ("Len") Trinidad, Managing Consultant, who will act as the Project Manager and will be the direct point of contact on behalf of LEI throughout the engagement. Finally, Amit Pinjani – Managing Consultant, Lance Brooks – Senior Consultant, and Jawahar Shah – Consultant, will be relied upon to complete key analyses. LEI may utilize junior staff to assist in research and data gathering. A brief summary of the LEI's project team's experience is provided below with detailed curriculum vitae provided in Section 5.

Figure 6. Project team organizational chart



Julia Frayer, Principal and Managing Director of LEI**,** Julia manages LEI's quantitative business practice area, and also specializes in market issues related to electricity. Sample projects include short- and long-term forecasting of wholesale power prices; valuation of generators, vertically-integrated utilities, energy sales agreements; and structuring sale processes for energy assets and derivative contracts. Over the last few years, she has led over a dozen modeling exercises in the northeast US and neighbouring regions. She also leads many of the firm's market design engagements, spanning such diverse issues as market power mitigation, auction design (including competitive solicitations for energy procurement), wholesale market rules design, and competitive market efficiency benchmarking. Julia has testified on behalf of clients before a

number of regional and national energy regulatory agencies, including the OEB, the California Public Utilities Commission, the Maine Public Service Commission, the Connecticut Department of Public Utilities Control, and FERC.

Cherrylin Trinidad (or Len) is a Managing Consultant at LEI and will be the project manager for the engagement, and is the lead market analyst and modeler of the one of the largest electricity markets in the world, the Pennsylvania-New Jersey-Maryland (PJM) Interconnection market. She has also modeled the New England and the Luzon (Philippines) markets. Len has supported regulated rate design in the wires sector and is a lead researcher for the firm in the area of transmission cost allocation and performance based rate design. Prior to joining LEI, Len worked as a Consultant with USAID, and she has a Masters degree in International Affairs with concentration in International Energy Management and Policy from Columbia University, NY.

Amit Pinjani, a Managing Consultant at LEI, has extensive experience advising international and Canadian clients on matters of regulatory framework and market structures. Amit has worked on various economic and regulatory advisory projects in addition to managing energy litigation and asset valuation projects with the firm. Prior to LEI, he worked as an Analyst for the Investment Banking Division at Citigroup Pakistan and assisted on various capital market and mergers and acquisition transactions. Amit also recently testified in front of the Alberta Utilities Commission in relation to an independent evaluation of the shape risk auction proposal for one of Alberta's regulated rate option ("RRO") providers.

Lance Brooks, a Senior Consultant with LEI, has recently joined the team from Australia where he brings a strong economics background in energy, utilities and infrastructure sectors. Lance has advised a broad range of public and private energy, utility and infrastructure clients and government departments on matter relating to; cost allocation and internal transfer pricing, rate design and evaluation, deregulation of the energy/power markets and power market risk management and hedging strategies. Lance is the lead modeler of the Ontario power market, providing detailed long-term forecasting of the Hourly Ontario Energy Price ("HOEP") and the Global Adjustment ("GA").

Jawahar Shah, a Consultant with LEI has over four years of experience in the energy sector, specializing in renewable energy projects. He has worked with project developers, utilities, regulators and international development banks in the US and India. Jawahar has experience modeling various types of renewable energy technologies, primarily large scale grid interactive solar PV plants and off-grid or distributed generation projects powered by solar PV, wind or biomass. He is proficient at evaluating the financial and economic viability of energy projects, and has conducted project level due diligence for the World Bank Group and the Asian Development Bank. In addition, Jawahar is also familiar with typical renewable energy incentives, policies and regulations in various markets and has worked on several projects involving policy and regulatory design and recommendations on market development for policymakers.

4.1 Schedule and budget

Based on the work plan detailed above and the level of analysis required, LEI estimate it will take up to 20 weeks to complete the engagement including preparation of the proposed

deliverables outlined in section 2.2 . Figure 7 provides a breakdown of the proposed schedule per task.

Figure 7. Proposed schedule

Task	Description	Week 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Electricity Supply Procurement Assessment																				
1a	Review of existing approach, outcomes and Delaware market dynamics																				
1c	Literature review & Case study: approaches adopted in North America																				
	D1 - Briefing Memo (Initial Findings)																				
2	Electricity Supply Procurement Options Recommendations																				
4	Modeling to Support Recommendations																				
	D2 - Excel Modeling & Briefing Memo (Alternative / Recommendations)																				
3	Review of Legislation and Change Recommendations																				
	D3 - Briefing Memo (Legislative updates)																				
	D4 - Final Report																				

Note: LEI anticipates incorporating PSC feedback on all draft deliverables prior to issuing its Final Report.

The estimated total professional budget for the engagement would be $96,525. This represents a fixed fee to complete the engagement inclusive of estimated expenses. Estimated expenses for completing the engagement include two flights, for two people to fly from Boston to Delaware to present the findings from the review and to meet with PSC and Delmarva staff during the course of the project. Figure 8 below provides a breakdown of this fee and estimated hours per task. LEI has provided a significant discount on its standard hourly rates in estimating the proposed fee as highlighted in Figure 10.

Invoices will be submitted on a monthly basis, based on the accrued work completed by the LEI project team. Invoices will contain sufficient detail regarding the tasks completed and the number of hours spent by each team member.

Figure 8. Estimated budget (US$), total hours

Task No.	Description	Budget	Total Hours
1	Electricity Supply Procurement Assessment	$37,100	150
2	Electricity Supply Procurement Options Recommendations	$22,050	80
3	Review of Legislation and Change Recommendations	$14,750	55
4	Modeling to Support Recommendations	$22,625	85
	Total	**$96,525**	**370**

Figure 9. Estimated budget by LEI project team

Name	Position	Billing Rate (per hour)	Hours	Total
Julia Frayer	Managing Director	$400	35	$14,000
Ma. Cherrylin Trinidad	Managing Consultant	$315	65	$20,475
Amit Pinjani	Managing Consultant	$315	40	$12,600
Lance Brooks	Senior Consultant	$240	115	$27,600
Jawahar Shah	Consultant	$190	115	$21,850

Note: Expenses have been accounted for within the hourly billing rates

Figure 10. LEI hourly rates (US$)

Position	Standard rates	Rates for this proposal
Principal / Managing Director	$625	$400
Managing Consultant	$495	$315
Senior Consultant	$375	$240
Consultant	$295	$190
Research Associate	$195	$125
Admin	$100	$65

5 Appendix A: Proposed project team curriculum vitae

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Julia Frayer

Managing Director, London Economics International LLC

LONDON ECONOMICS

KEY QUALIFICATIONS:

Julia Frayer is a Managing Director at London Economics International LLC ("LEI"), with more than 15 years of experience providing expert insights and consulting services in the power and infrastructure industries. Julia specializes in the analysis and evaluation of infrastructure assets; she has worked extensively in the US, Canada, Europe, and Asia in valuing electricity generation and wires assets, water and wastewater networks, as well as gas transportation assets. Julia manages LEI's quantitative, financial and business practice areas, and has built an in-house competency in issues related to market design, competitive market and auction design, capacity market analyses and strategic analysis of investment in wholesale power markets.

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

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

EDUCATION:

Institution	Graduate School of Arts & Sciences, Boston University
Degree(s) or Diploma(s) obtained:	MA in Economics

Institution	School of Arts and Sciences, Boston University
Degree(s) or Diploma(s) obtained:	BA in Economics and International Affairs

EMPLOYMENT RECORD:

Date:	February 1998-Present
Location:	Boston, MA
Company:	London Economics International

MOST RECENT PROJECT EXPERIENCE

Date:	2014
Location:	Alberta, Canada
Company:	ENMAX
Description:	ENMAX retained LEI to act as an independent expert on matters related to proposed auctioning for the Load Following Service ("LFS") product. LEI provided an independent evaluation of the proposed auction, including evaluation of the both the product being auctioned and the auction mechanism and key parameters. The LFS product as proposed to be auctioned was meant to represent the "shape risk" in the RRO service. LEI's evaluation considered whether the product and auction mechanism would result in an efficient, competitive and fair outcome for the Alberta market, RRO providers, potential suppliers of the auctioned product, and customers of the RRO service. LEI prepared a report titled "Independent assessment of proposed market-based determination of shape risk in RRO supply" dated January 24, 2014, which was filed in Application No. 1610120, Proceeding No. 2941 to the Alberta Utilities Commission ("AUC") by EEC on January 27, 2014.

Date:	2014
Location:	Ontario, Canada
Company:	Private Client
Description:	LEI assessed the economics of the proposed Lake Erie HVDC transmission project to investors and potential customers, by projecting revenue streams associated with the sale of energy, capacity and other products via transit on the Lake Erie HVDC transmission project ("LEP"). The LEP is a 100-km long 1,000 MW bi-directional HVDC transmission line that will connect the Ontario energy market with the PJM market. LEI prepared a comprehensive report that includes a review of the Ontario and PJM markets, a 20-year (2017 to 2036) market outlook and prices for electricity, capacity and renewable energy credits in Ontario and the relevant zone/s in PJM; the total gross arbitrage value for the energy congestion rents, the capacity revenue potentials for PJM, and the renewable energy credits revenue potential in PJM.

Date:	2013
Location:	United States
Company:	Private Client
Description:	LEI was retained to perform a due diligence and market study for three hydro units in PJM. LEI's tasks included reviewing the merchant prices and REC prices, evaluating the power purchase agreement and capacity charges and providing energy, capacity and REC forecasts.

Date:	2013

Location:	Texas, United States
Company:	Entergy, Inc./Public Utility Commission of Texas
Description:	Julia and her team of economists were engaged by Entergy, Inc. to provide independent review and assessment of cost-benefit analysis related to termination of certain PPAs between Entergy Texas Inc. and Entergy Louisiana. LEI's assessment was requested by the Public Utility Commission of Texas, as follow on to previous consultative services that LEI has provided.

Date:	2013
Location:	California, United States
Company:	Pacific Gas & Electric
Description:	LEI served as Independent Evaluator ("IE") for Pacific Gas & Electric Company ("PG&E") for PG&E Electric Fuels Department's Natural Gas Storage Services Request for Offer ("RFO"). Specifically, LEI worked with PG&E to ensure that Offers were evaluated consistently and appropriately in accordance with the solicitation protocol and in accordance with applicable rules and processes of the California Public Utilities Commission ("CPUC").

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, and forecast prospective revenues of a portfolio of pumped storage and conventional hydro generation facilities offered by FirstEnergy, over a 20 year horizon.

Date:	2012-2013
Location:	California, United States
Company:	Pacific Gas & Electric
Description:	Julia and the LEI team served as the Independent Evaluator for PG&E Request for Offers for natural gas storage which was successfully concluded in January 2013. Julia reported on the RFO process and selection of winning bidder to the Peer Review Group and Energy Division staff at the California Public Utilities Commission ("CPUC").

Date:	2012
Location:	New England, United States
Company:	Private company
Description:	Julia managed a market study reviewing historical electric rates (and projecting forward electric rates) for large commercial customers in the New England market. The electric rates analysis was composed of a number of components, such as the commodity costs of electricity, compliance costs for certain state programs (like RPS), delivery charge for delivering electricity, and ancillary services and administrative supply charges. LEI created projection for each of these components and considered state retail sales requirements for renewables, etc.

Date:	2011
Location:	United States
Company:	Private Client
Description:	LEI supported the negotiation of fuel supply and energy sales agreements for a biomass to energy facility. In particular, LEI's analysis focused on the appropriateness and risk associated with price and cost escalation factors. Reviewed similar power purchase agreements and analyzed a suite of available indices.

Date:	2011
Location:	United States
Company:	Private Client
Description:	Provided valuation services for a waste coal facility located in the Pennsylvania-New Jersey-Maryland ("PJM") regional market. Specific tasks consist of i) due diligence review of documents such as past financial statements, operational statistics report, fuel agreements and power purchase agreements ("PPA"); ii) forecasts energy and capacity prices in the PJM regional market; iii) create a pro forma financial model to evaluate the market value of the plant as of expiration of its PPA; iv) writing a final report documenting assumptions, methodologies used and modeling results.

Date:	2010 – 2011
Location:	Massachusetts, United States
Company:	Private Client
Description:	Julia Frayer served as lead expert witness for a private equity investor in matter related to a contractual dispute regarding a long term power purchase agreement between a municipal utility located in New England and a landfill gas generator. Ms. Frayer analyzed key contractual terms of the PPA and provided an expert's review of how those terms compared to the industry norm when the contract was signed and became effective. Ms. Frayer provided an independent estimate of potential contractual damages. The case was scheduled be heard in Massachusetts Superior Court, however, Julia's analysis helped support a successful settlement.

Date:	2009-2010
Location:	Maine, United States
Company:	Maine Public Utilities Commission
Description:	Julia and the LEI team are currently assisting the Commission on the RFP related to the procurement of electricity in response to statutory mandates and state policy preferences. LEI provided economic analyses of bid proposals by estimating the benefits and costs to the ratepayers, and supported Commission staff in negotiations with short-listed bidders.

Date:	2009
Location:	United States
Company:	Private Clients

Description:	Julia led a due diligence team and assisting in the exclusivity negotiations with respect to an acquisition of a 400+ MW coal fired plant in the PJM market by a group of private investors. Julia's role included management of LEI's economic appraisal, coordination of preliminary technical due diligence, negotiations with third parties on possible off-take arrangements, and oversight over financial modeling.

Date:	2009
Location:	United States
Company:	Private Client
Description:	Julia investigated opportunities for portfolio of biomass plants to earn renewable energy revenues from RECs, capacity markets, and carbon offsets given regulations in all states belonging to MISO, PJM, and ISO-NE. Engagement also involved formulating strategies for client to optimize the generation assets' revenue potentials by exploiting the identified renewable energy opportunities.

Date:	2009
Location:	Canada
Company:	Private Client
Description:	Julia advised a major utility in Canada in its call for tenders strategy for procuring firm capacity over a long term horizon from neighbouring jurisdictions. Julia evaluated the opportunity for purchasing capacity from interconnected jurisdictions and devising a procurement that would efficiently overcome seams issues and market design issues that attach different counting and valuation methods for capacity across jurisdictions.

Date:	2008
Location:	Utah, United States
Company:	PacifiCorp
Description:	Julia was part of a consortium that is serving as the Independent Monitor for PacifiCorp's renewable solicitation process for the 2008R-1 solicitation process for additional renewable power supplies. The Independent Monitor will report to the Utah Public Service Commission. This process includes review and assessment of the solicitation process, documents, and modeling methodologies; valuation of the bidder pre-approved process; development of review criteria, monitoring, auditing, and validation of bid evaluation process; bid evaluation; contract negotiation. Final report and testimony has been filed with the Utah PSC. (Public Utility Commission of Oregon, Docket No. UM1368)

Date:	2008
Location:	Alberta, Canada
Company:	Private Client

Description:	Julia led a team that provided a comprehensive analysis of the proposed market power mitigation measures for Alberta's electricity market for a major utility. Julia and her team looked at various scenarios and presented the likely outcomes given various generation portfolio configurations under each proposal and whether these mitigation measures will result in the desired results. Led by Julia, the LEI staff made a case that more rigorous and robust approaches are needed than the proposed measures. Additionally, Julia's team conducted a comparative analysis of the procurement processes and compensation schemes of the different ancillary services products in eight markets, namely: New York, New England, Pennsylvania-New Jersey-Maryland, Texas, UK, Alberta, Australia, and Ontario. The results of this analysis were used to support the client in the Alberta's stakeholder process to redesign a system operator's procurement process.

Date:	2006
Location:	Connecticut, United States
Company:	Connecticut Department of Public Utility Control
Description:	Julia has evaluated measures needed to reduce Federally Mandated Congestion Charges ("FMCC") in Connecticut. Together with the LEI team she also performed an economic evaluation of the New England and Connecticut energy markets using LEI proprietary production cost model, POOLMod. Julia testified at the Connecticut Department of Public Utility Control ("DPUC") regarding the RFP process, RFP documentation, and contract template. Julia also testified on evaluation of project bids in comparison to anticipated market outcome. Julia's analysis supported hundreds of millions of dollars of investments.

Date:	2006
Location:	California, United States
Company:	California Energy Commission
Description:	LEI was contracted by CEC to study the capacity products that have been traded in other jurisdictions, and more broadly examine trading platforms that may be useful models for California if a voluntary trading mechanism was implemented to assist market participants in trading capacity to achieve compliance with Resource Adequacy Requirements. Additionally, LEI produced a report to cover the functional requirements for a bulletin board posting and trading platform for bringing buyers and sellers together and allow trading of the various capacity products supported by RAR in California, such as System RA Capacity and Local RA Capacity, and possibly some form of Import RA Capacity. LEI also covered the functional requirements for a tracking system, including title tracking, certification of transactions, and possibly, compliance filing.

Date:	2006
Location:	California, United States
Company:	California Energy Commission

Description:	LEI advised the California Energy Commission and other stakeholders on the design and development of a web-based software system supporting the trading of an electricity capacity product tracked by state regulators in connection with resource adequacy requirements. LEI analyzed similar systems in other jurisdictions, defined potential core functionalities of the California system – including, for example, posting of bids and offers. The engagement also required LEI to track titles, examine bilateral and/or multi-lateral trades and compliance reporting. LEI conducted a survey of industry participants to identify required and desired system capabilities.

Date:	2005-2006
Location:	Connecticut, United States
Company:	Connecticut Department of Public Utility Control
Description:	The Department of Public Utility Control retained the services of LEI to assist the DPUC in monitoring the power procurement processes for Connecticut Light & Power's (CL&P) Transitional Standard Offer auction in November 2004 for services in 2005 and 2006, and once again selected LEI in September 2005 to monitor the November 2005 auction for services in 2006. Julia led LEI's team in providing advisory services to the DPUC, including guidance on communications protocols, design of sales contract agreement (between CL&P and winning bidders), and also valuation of final bids vis-à-vis the forward market alternatives available to the utility. In November 2004 and 2005, Julia filed an affidavit after completion of the procurement process which the Commissioners used to approve the process and the contracts between CL&P and the winning bidder.

Date:	2005
Location:	California, United States
Company:	California Public Utility Commission
Description:	Julia served as an expert witness on economic issues related to pricing, investment signaling and data confidentiality in Resource Adequacy and Procurement Proceedings at the California Public Utility Commission in November-December 2005 on behalf of the California Energy Commission. Julia authored direct and rebuttal testimony on these issues and testified in San Francisco in late November 2005.

Date:	2004-2005
Location:	Connecticut, United States
Company:	Connecticut Department of Public Utility Control
Description:	In her affidavits in 2004 and 2005 before the Connecticut Department of Utility Control, Julia described the procurement processes of Connecticut Power and Light Company ("CL&P") TSO. Her testimony outlined best practice and procurement processes for DPUC to adopt in order to have the most efficient and competitive process which would result in the lowest price possible for the electricity consumers under CL&P's TSO.

Date:	2002
Location:	United States
Company:	Private Client

Description:	LEI was engaged by a large industrial customer to help review of power purchasing options at one of its Southeastern facilities over the next three years. We assessed the probability of a supply interruption over the next three years due to the state of the transmission system in this region. We also assessed the facility's options for purchasing power for this load in the wholesale market.

Ma. Cherrylin Trinidad

Managing Consultant, London Economics International LLC

LONDON ECONOMICS

KEY QUALIFICATIONS:

Cherrylin or Len is a Managing Consultant at London Economics International LLC and is the lead market analyst and modeler of the one of the largest electricity markets in the world, the Pennsylvania-New Jersey-Maryland (PJM) Interconnection market. She has also modeled the New England and the Luzon (Philippines) markets. Len has supported regulated rate design in the wires sector and is a lead researcher for the firm in the area of transmission cost allocation and performance based rate design. Prior to joining LEI, Len worked as a Consultant with USAID, and she has a Masters degree in International Affairs with concentration in International Energy Management and Policy from Columbia University, NY.

EDUCATION:

Institution	Columbia University
Date:	2005-2007
Degree(s) or Diploma(s) obtained:	Masters in International Affairs with 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:	Managing Consultant (April 2012-Present); 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:

Date:	2014 (ongoing)
Company:	Private Client
Location:	North America
Description:	Len is currently part of a team that is looking at the price and macroeconomic impact of closing some nuclear plants in PJM. The project involves 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 (ongoing)
Company:	Private Client
Location:	North America
Description:	Len is currently leading 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 is looking into acquiring the proposed plant located in Maryland.

Date:	2014 (ongoing)
Company:	Private Client
Location:	North America
Description:	Len is currently working 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 will evaluate both the revenue opportunities to the investors as well as the societal benefits to the MISO system. The team also needs to evaluate 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 green value of the project.

Date:	2014
Company:	Private Client

Location:	North America
Description:	Len led a team that projected the energy and capacity revenues of a proposed gas-fired plant in Ohio. Len 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:	LEI is currently retained by a Canadian provincial government to serve as advisor to its electricity system organization and governance. In particular, LEI is hired to analyze the emerging trends in utility governance, organization, performance, and accountability. Len is part of the team and wrote sections of the literature review on performance-based ratemaking. Len also managed the team that prepared the Comparator Industry Design and Regulation Report, which consists of a number of 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:	2014
Company:	Private Client
Location:	North America
Description:	Len was part of a team that performed a due diligence for a hydro plant in PJM. Len performed an energy and capacity price forecasts for 20 years. Len 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:	Len was part of a team that prepared a regulatory checklist for a client that was interested in making investments in the US. Len 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:	2014
Company:	Private Client
Location:	North America
Description:	Len 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:	2014
Company:	Private Client
Location:	North America
Description:	Len was part of the team that assisted a client in reviewing the Massachusetts House

	Bill 3968 (or An Act Relative to Clean Energy Resources) and providing insights as to the advantages and disadvantages of long-term contracts.

Date:	2013
Location:	US
Company:	Private client
Description:	Len 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
Location:	Canada
Company:	Private client
Description:	Len was part of a team that prepared an expert report on different incentive ratemaking 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 ratemaking 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"). Len 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:	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"). Len 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:	Len 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:	2013
Location:	United States
Company:	Duke-American Transmission Company
Description:	Len 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:	2013
Location:	United States
Company:	Brookfield Renewable Energy Marketing
Description:	Len was part of a team of economists that supported the client in preparation of a merger application to the Federal Energy Regulatory Commission ("FERC") under Section 203 of the Federal Power Act, in conjunction with the client's acquisition of a Maine-based hydroelectric generation portfolio. LEI performed a full Delivered Price test analysis for the ISO New England control area. LEI's analysis was filed with FERC and the Merger Application was approved in February 2013.

Date:	March 2013 – April 2013
Location:	USA
Company:	Private Client
Description:	LEI was retained to provide a generation market power screening analysis on potential acquisitions in the ERCOT market. Len conducted an HHI analysis to determine the impact of the potential acquisitions on the clients' market power.

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. Len 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:	2012-2013
Location:	United States/Europe
Company:	Private Client
Description:	Len 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:	2012
Location:	United States
Company:	NRG, Inc.
Description:	Len was part of a team of economists that assessed the wholesale power market impacts of the merger of NRG, Inc. and GenOn. LEI staff, under Julia's direction and guidance, performed Delivered Price Tests analysis for the Federal Energy Regulatory Commission ("FERC") under Section 203 of the Federal Power Act and submitted extensive analysis to FERC in the summer of 2012. The Merger Application was successfully approved by FERC in December 2012. Subsequently, LEI assisted the client in preparation of the 205 market-based rate authority analysis.

Date:	2010-2012
Location:	United States
Company:	Transmission Developers, Inc. ("TDI")
Description:	Len 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 on economic effects was the cornerstone of the settlement agreement reached between TDI and a number of New York agencies. Results of the modeling were filed to the Commission. Study is available at the client's website at http://www.chpexpress.com/docs/Analysis-of-the-Macroeconomic-Impacts-of-the-Proposed-CHPE-Project.pdf.

Date:	2012
Location:	New York, USA
Company:	Private Client
Description:	Market power analysis: In connection with potential acquisitions, Len performed an HHI analysis for the New York energy markets, FERC's indicative screens (Pivotal Supplier Screen and Market Share Screen) for the client.

Date:	2012

Location:	PJM
Company:	Private Client
Description:	Market power analysis: In connection with potential acquisitions, Len performed an HHI analysis for the PJM energy markets, FERC's indicative screens (Pivotal Supplier Screen and Market Share Screen) for the client.

Date:	2012
Location:	Saudi Arabia
Company:	King Abdullah City for Renewable and Atomic Energy ("K.A. C.A.R.E.")
Description:	Len 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:	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. Len 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:	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:	September 2011
Location:	British Columbia, Canada
Company:	Private Client
Description:	On behalf of British Columbia power producers, LEI analyzed current and future dynamics in the British Columbia power markets. Topics analyzed included costs of independent power producers ("IPPs") relative to BC Hydro, uncertainty around future demand levels in BC, implications of moving away from use of Critical Water Year analysis in planning, risks and uncertainties regarding import availability, and the overall macroeconomic contributions of IPPs. LEI also analyzed the provincial government's Review of BC Hydro and provided an assessment.

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:	May 2011-2012
Location:	USA
Company:	Private Client
Description:	Len 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:	Len 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, Len 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.

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:	May-June 2010
Location:	New England
Company:	Maine Public Utilities Commission ("MPUC")
Description:	Len updated the London Economics International Renewable Energy Credit ("REC") model for New England and forecasted the REC prices for class I resources for the next 10 years (2010-2019), which was used to evaluate bids to the Maine PUC energy procurement.

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:	July-August 2010
Location:	ISO-NE
Company:	Private Client
Description:	Len performed the Delivered Price Test as required by FERC. LEI studied the CAISO and ISO-NE markets. Len was responsible on the analysis in the ISO-NE market. Analysis included DPT for energy markets and HHI analysis for capacity markets. Len also performed several sensitivities.

Date:	June-July 2010
Location:	PJM
Company:	Private Client
Description:	As part of a team, Len evaluated PJM's capacity market to determine how the merger of two utilities in the market will affect the PJM capacity market.

Date:	Feb-May 2010
Location:	Alberta
Company:	Private Client

Description:	Len 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:	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. Len 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.

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. Len was the primary modeller for the PJM Interconnection region, providing an analysis of market dynamics and potential revenues for the purpose of valuing 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. Len was responsible for making the assumptions to the price forecasting, running the POOLMod simulation, and interpreting the results of the simulation.

Date:	May – June 2008
Location:	Maine
Company:	Maine Public Utility Commission
Description:	Len 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.

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 a 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 Utility Commission
Description:	Len 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 – September 2007
Location:	Multiple locations
Company:	Private Client
Description:	Len 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. Len 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.

Date:	July 2007
Location:	Canada
Company:	Private Client
Description:	Len 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:	Len 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:	Len 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.

Date:	April 2005
Location:	Manila, Philippines
Company:	Private Client
Description:	Len conducted the focus group discussions for 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:	Len 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:	Len 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. Len 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.

Amit Pinjani

Managing Consultant, London Economics International LLC

LONDON ECONOMICS

KEY QUALIFICATIONS:

Amit Pinjani joined LEI as a summer associate in 2007 and continued working as a part-time Consultant with the firm along with pursuing his MBA. He joined as a full-time Consultant with LEI in December 2008, was promoted to Senior Consultant in December 2009 and to Managing Consultant in October 2013. Prior to LEI, he was working as an Analyst for the Investment Banking Division at Citigroup Pakistan where he assisted on capital market transactions and sell-side M&A deals. Amit's exposure to the energy sector began during his stay at Eni (previously Lasmo Oil) in 2004-2005, where he worked as a Graduate Economist, modeling the economics of various internal projects, and assisting senior management in economic and project evaluation of oil and gas reserves.

Amit has been deeply involved with LEI's engagements in North America, especially Western Canada, along with international engagements in Saudi Arabia and the rest of Middle East. He has worked on various regulatory advisory projects in addition to assisting on energy litigation support and asset valuation projects with the firm.

EDUCATION:

Institution	International Business School, Brandeis University, Waltham, MA, USA
Date:	2006-2008
Degree(s) or Diploma(s) obtained:	MBA (International Business & Finance)

Institution	Lahore University of Management Sciences, Pakistan
Date:	1999-2003(MSc) and June 2003 (BSc Honours)
Degree(s) or Diploma(s) obtained:	BSc (Honours) - Major: Economics, Minor: Mathematics MSc (Economics)

EMPLOYMENT RECORD:

Date:	2008 – present
Location:	Boston, MA; Toronto, ON
Company:	London Economics International LLC
Position:	Managing Consultant (October 2013 – present) Senior Consultant (December 2009 to September 2013) Consultant (December 2008 to November 2009) Part-time Consultant (Sep 2007 to Nov 2008) Summer Associate (June 2007 to Aug 2007)

Date:	February 2005 to July 2006
Location:	Karachi, Pakistan
Company:	Citibank N.A.
Position:	Assistant Manager, Corporate Finance / Investment Banking Group

Date:	January 2004 to February 2005
Location:	Karachi, Pakistan
Company:	Eni Group
Position:	Graduate Trainee

RECENT PROJECT EXPERIENCE:

Date:	2014
Location:	Nova Scotia, Canada
Company:	Department of Energy
Position:	Project Manager
Description:	LEI was retained by the Department of Energy to perform a review of the organization and governance of electricity systems both cross-jurisdictionally and within the province of Nova Scotia. The scope of work was divided into two main phases: (i) Review of international best practices and lessons learned; and (ii) Translation of best practices and lessons learned into best fit for Nova Scotia.

Date:	2014
Location:	Alberta, Canada
Company:	Private Client
Position:	Project Manager / Senior Analyst
Description:	LEI was engaged by counsel to provide an independent valuation of an asset in conjunction with a tax payment challenge for an Alberta generator. LEI assessed the appropriateness of valuations related to the acquisition of a coal-fired generating station. Engagement required developing power pool price forecasts that would have been appropriate as of the valuation date several years previously, as well as estimating a range of asset values using multiple valuation approaches. The engagement also included developing critiques of work prepared by opposing expert witnesses.

Date:	2014
Location:	Canada
Company:	Private Client
Position:	Project Manager
Description:	LEI was retained by a private client to perform a high-level estimation and analysis of potential opportunity for developing low carbon energy exports from Canadian markets to target US power markets. LEI presented the analysis at the ABB Energy and Automation Forum on September 10, 2014.

Date:	2014

Location:	Illinois, United States
Company:	Private Client
Position:	Project Manager
Description:	LEI was retained to analyze revenue/gross margin modules for various district energy assets being considered for acquisition. LEI reviewed information received from the client, including detailed documents in the data room, and presented analysis in a slide deck relating to contract revenues (prices and volumes) and fuel costs (electricity) along with revenue and cost drivers. LEI also presented sensitivity analysis for high/low sales volumes, new customers, expiry dates of existing contracts, fuel costs etc.

Date:	2013–2014
Location:	Alberta, Canada
Company:	Private Client
Position:	Project Manager
Description:	LEI was retained as an independent expert on matters related to proposed auctioning for the Load Following Service ("LFS") product. LEI provided an independent evaluation of the proposed auction, including evaluation of the both the product being auctioned and the auction mechanism and key parameters. The LFS product as proposed to be auctioned was meant to represent the "shape risk" in the RRO service. LEI's evaluation considered whether the product and auction mechanism would result in an efficient, competitive and fair outcome for the Alberta market, RRO providers, potential suppliers of the auctioned product, and customers of the RRO service. LEI prepared a report titled "Independent assessment of proposed market-based determination of shape risk in RRO supply" dated January 24, 2014, which was filed in Application No. 1610120, Proceeding No. 2941 to the Alberta Utilities Commission ("AUC") by EEC on January 27, 2014.

Date:	2013-2014
Location:	Alberta, Canada
Company:	Private Client
Position:	Project Manager

Description:	LEI was retained by a private client to evaluate the potential acquisition of incumbent transmission companies located in the Alberta power market. Specifically, the client was seeking assistance in understanding the regulatory regime in Alberta as it relates to transmission ratemaking, as well as potential drivers for transmission asset values in Alberta. LEI provided the client with a PowerPoint presentation focusing on historical background of each of the following subjects, discussing the current state of play related to the subject, and conceptually discussing how important it may be in the overall consideration of value. The subjects discussed were as follows: (i) overview of transmission ratemaking in Alberta; (ii) potential regulatory issues resulting from the transaction; and (iii) potential value drivers (including development of the deemed cost of capital for transmission, evolution of performance-based ratemaking ("PBR") and relevance to transmission, distinguishing between those future capex projects that will retain incumbent preference and those that will be placed into competitive processes, and overall implications of Alberta transmission policy for future interconnected load growth versus behind-the-meter growth)

Date:	2013–2014
Location:	Alberta, Canada
Company:	Alberta Electricity System Operator
Position:	Project Manager
Description:	LEI was retained by the Alberta Electric System Operator (AESO) to develop a transmission cost causation study. The study was used for the determination of the AESO's Demand Transmission Service Rate DTS, and was filed with AESO's 2014 tariff application to the Alberta Utilities Commission (AUC). The study covered four main topics: (i) Functionalization of Capital Costs; (ii) Functionalization of Operating & Maintenance (O&M) costs; (iii) Classification of Bulk and Regional System Costs; and (iv) Implementation Considerations. From July to October 2013, LEI worked with the AESO to facilitate technical sessions and Negotiated Settlement Agreement (NSA) meetings, which involved in-depth discussions regarding methods used and results. Through these meetings, extensive due diligence was performed by stakeholders on LEI's work, and LEI submitted a revised cost causation study in early November. On November 7, 2013, the AESO filed an application for approval of the NSA (along with the revised cost causation study), which was unanimously supported by all participants in the process.

Date:	2013
Location:	California, United States
Company:	Private Client
Position:	Project Manager

Description:	LEI was retained by a private client to analyze alternative technology solutions in relation to preparation of a bid for a Southern California Edison Company ("SCE") Local Capacity Requirements ("LCR") Request for Offers ("RFO"). Work included: (i) a review of the RFP, PPA and related documents and creation of a working memo on relevant issues; (ii) PoolMod (hourly dispatch simulation model) Base Case and up to four sensitivities for the California market for a 20 year time frame, varying only the AES technology solution for the Southland project; (iii) development of an excel pro-forma financial model for comparison of up to four technology alternatives; and development of a brief PowerPoint slide deck.

Date:	2011-2013
Location:	Saudi Arabia
Company:	Private client
Position:	Project Manager
Description:	LEI was engaged by a large Middle Eastern client involving development of the renewable energy competitive procurement process (CPP), customized feed in tariff (FIT) program, sustainable energy procurement company (SEPC), and a procurement leverage strategy (PLS). The client's objective of procuring significant amount of renewable energy by 2032 had to be carefully balanced with competing objectives related to macroeconomic development. The work conducted by the project team consisted of four interrelated "modules": (i) detailed design of a CPP and underlying documents; (ii) detailed design of a robust and flexible FIT building upon the design of the CPP and underlying documents; (iii) company framework documents for the formation of a creditworthy SEPC (covering the legal and regulatory framework, mandate, board structure and composition, business and human resources plans, and organizational structure); and (iv) algorithmic model and detailed strategy for a procurement leverage strategy infused throughout other modules, promoting the client's objectives in terms of job creation, local content, training, and research & development. Throughout the engagement, international best practices (building on case studies covering 18 jurisdictions) were taken into account and translated into best fit for the Saudi economic, legal, regulatory, and financial context. The engagement was structured so that implementation is essentially a matter of "pushing the button": templates, contract forms, online frameworks, promotional material, etc. were created.

Date:	2013
Location:	Ontario, Canada
Company:	Private Client
Position:	Project Manager

Description:	LEI was retained to review Union Gas ("Union") proposed 2014 to 2018 incentive ratemaking ("IR") plan and to examine case studies of approaches to IR applied to other North American gas distribution utilities. In the case study analysis, LEI examined approaches to a set list of ratemaking parameters: productivity and X-factor trends, alternative approaches to designing an I-X framework, approaches to establishing inflation factors, approaches in other jurisdictions to applying an Earnings Sharing Mechanism ("ESM"), use of capital trackers for unknown costs, appropriateness of deferral accounts for unaccounted-for gas ("UFG"), and service quality indicators ("SQIs") and how they are measured. LEI was subsequently requested by Union to provide comments on Union's draft Settlement Agreement, which was accepted by the Ontario Energy Board ("OEB") in October 2013.

Date:	2010- 2011
Location:	Saudi Arabia
Company:	Private Client
Position:	Senior Analyst / Modeller
Description:	Amit was a key member of the project team involved in the development of a financial, commercial, and regulatory framework, as well as drafting an investment strategy and model for a large Middle Eastern private client. Deliverables included: (i) A master plan on how to develop renewable and atomic energies based on local value chains in Saudi Arabia; (ii) An economic framework to create a favorable environment in order to follow this master plan; (iii) An investment strategy to make use of KSA resources and available funds in an efficient way; (iv) A multitude of international case studies to avoid costly mistakes in the future and to know when to adopt; (v) A final report on 'National Policy for Investment in Alternative Energy Sources'; and (vi) Two 'sales pitch' documents for submittal to the King's Supreme Council and for the financial community.

Date:	2010-2011
Location:	Jordan
Company:	Private Client (Regulator)
Position:	Senior Analyst / Modeller
Description:	LEI was retained by the electricity regulator to advice on the weighted average cost of capital and optimal capital structure for Jordan's three distribution companies: EDCO, IDECO and JEPCO. This included identifying salient risk factors for the distribution companies, identifying appropriate local and international metrics and benchmarks, developing a usable cost of capital model, and providing training workshops for local staff.

Date:	2010-2011
Location:	Alberta, Canada
Company:	Private Client
Position:	Senior Analyst / Project Manager

Description:	Valuation associated with coal station contracts: Amit was extensively involved in the analysis as an external consultant retained by a law firm to provide an independent assessment of costs associated with coal-fired generation units in Alberta, consistent with their underlying power purchase arrangements. The range of cost estimates was developed using pro forma cash flow analysis performed for both owner and buyer under the PPA, by modeling flows of payments under the PPA (and post-PPA life) and using results of forward wholesale price forecasts of the Alberta Power Pool, along with research associated with related environmental regulations on plant refurbishments in the region. The analysis also relied on explicit modeling of revenues and costs and utilized a realistic specific discount rate for both the owner and buyer separately.

Date:	2010-2011
Location:	Massachusetts, United States
Company:	Private Client
Position:	Senior Analyst
Description:	Served as lead analyst in an expert testimony engagement for a private equity investor in matter related to a contractual dispute regarding a long term power purchase agreement between a municipal utility located in New England and a landfill gas generator. LEI analyzed the key contractual terms of the PPA and provided a review of how those terms compared to the industry norm when the contract was signed and became effective.

Date:	2010
Location:	Alberta, Canada
Company:	Private Client
Position:	Senior Analyst / Project Manager
Description:	Undertook a detailed review and analysis of historical and going-forward costs associated with Power Purchase Arrangements of a large independent power producer. The assignment presented a thorough analysis of PPAs and review of internal analysis performed by the IPP, suggesting next steps and alternative methodologies for review.

Date:	2010
Location:	Alberta, Canada
Company:	Private Client
Position:	Senior Analyst / Project Manager
Description:	LEI was retained by a Canadian power utility to provide advice on long-term Alberta electricity power prices (2010-2030) to inform an investment decision on a 800MW gas-fired power station based on different market parameters and build decisions. The project included a detailed assessment of gas procurement costs and forecast gas price trends. The forecast also made special note of the effect on the market, if any, of the following conditions: (i) greenhouse gas legislation; (ii) increase in unconventional (shale) natural gas production; (iii) effect of the enactment of Bill 50; and (iv) effect on the market by external jurisdictions. LEI was asked to provide two subsequent updates for the company's board of directors on the status of the project.

Date:	2010
Location:	Ontario, Canada
Company:	Private Client
Position:	Senior Analyst
Description:	Discovery of costs related to the development of renewable energy projects in aboriginal communities and assist and advise the client in the establishment of the Aboriginal Renewable Energy Fund. The Fund will provide grants based on a list of potential activities associated with the development of renewable energy projects.

Date:	2010
Location:	Ontario, Canada
Company:	Private Client
Position:	Senior Analyst
Description:	Investigate the types of costs incurred by a municipality when hosting a renewable energy project. Identifying which of these costs are paid for by the developer, and which are paid for by the municipality, in order to assist the client in the establishment of the Municipal Renewable Energy Fund. The Fund will provide grants to municipalities for direct costs of hosting renewable projects, which are not covered by developers.

Date:	2010
Location:	Ontario, Canada
Company:	Private Client
Position:	Senior Analyst / Evaluator
Description:	Monitoring of the application review process under the FIT program administered via the Green Energy Act. Work involved evaluating FIT applications independently and validating our results with those obtained by the client.

Date:	2009-2010
Location:	Saudi Arabia
Company:	Private Client
Position:	Senior Analyst / Modeller
Description:	LEI was retained for development of a regulatory framework for a power and water utility not regulated by the government, development of a charter for a new regulatory body, establishment of a recommended tariff structure and accompanying tariff model for all business activities, and filing of tariff petitions with the applicable regulatory authorities for approval.

Date:	2009-2010
Location:	Saudi Arabia
Company:	Private Client
Position:	Senior Analyst

Description:	Amit was part of the advisory team to the Saudi Arabian regulator on a strategic approach to incentivize renewable energy, including examination of best practice across various jurisdictions in feed in tariffs, competitive procurement, quota systems, and financial incentives and support mechanisms.

Date:	2009
Location:	Jordan
Company:	Private Client
Position:	Senior Analyst
Description:	Advised on new operating expenditure incentive mechanism for the power distribution sector in Jordan. Recommended adoption of a shared savings mechanism, which would allow customers and distribution companies to share in any profits or losses from changes in operating expenditure, and be consistent with Jordan's current regulatory structure.

Date:	2009
Location:	Ontario, Canada
Company:	Private Client
Position:	Project Manager
Description:	Project manager on work involving economic modeling to provide energy market price forecasts and detailed market reports for the three electricity markets, PJM, NYISO and Midwest ISO.

Date:	2009
Location:	New York, United States
Company:	Private Client
Position:	Project manager
Description:	Work involved economic modeling to provide 25-year energy and capacity market price forecasts for the Wisconsin and Minnesota (within Midwest ISO) power markets. Client was interested in 25-year energy and capacity price forecasts for the respective markets.

Date:	2008
Location:	Texas, United States
Company:	Private Client
Position:	Analyst
Description:	Examined and modeled long term energy price forecast scenarios for the Electric Reliability Council of Texas ("ERCOT") power market, where client considering investment in a wind farm in one of the ERCOT zones.

Date:	2005-2006
Location:	Karachi, Pakistan
Company:	Private Client
Position:	Analyst

Description:	Part of the advisory team to the Government of Pakistan on potential privatization of one of the largest public sector enterprises. Involved strategic industry and financial analysis, due diligence, and working with potential buyers

Date:	2005-2006
Location:	Karachi, Pakistan
Company:	Private Client
Position:	Senior Analyst
Description:	Worked as a lead team member in a capital syndication transaction involving eight corporate financial institutions for a takeover and long-term financing for a cement plant in Pakistan. Work involved financial modeling and future long-term cash flow forecasts

Date:	2004
Location:	Karachi, Pakistan
Company:	Private Client
Position:	Analyst
Description:	Developed economics of debottlenecking at a large gas reservoir. Work involved economic modeling and analysis of data provided by engineers and geologists

Lance Brooks

Senior Consultant, London Economics International LLC

LONDON ECONOMICS

KEY QUALIFICATIONS:

Lance joined LEI as a Consultant with a strong economics background in early 2014, having previously been based in Australia for nine years. There Lance was responsible for advising a broad array of public and private energy, utilities and infrastructure clients on various economic, financial and regulatory matters. This experience extends to the completion of tariff reviews and submissions, construction and analysis of financial, economics and statistical models for asset acquisitions and debt and equity issuances, analysis of the deregulation of energy/power markets, review of risk management and hedging strategies and analysis of cost allocation and tariff structures.

Lance previously held positions at Marchment Hill Consulting, Alinta Energy and Deloitte Touch Tohmatsu (Australia). Lance is the lead Ontario market modeler at LEI and is responsible for our semi-annual market price forecasts.

EDUCATION:

Institution:	Queensland University of Technology, Australia
Date:	2010
Degree(s) or Diploma(s) obtained:	Masters of Business (Applied Finance)

Institution	University of Queensland, Australia
Date:	2006
Degree(s) or Diploma(s) obtained:	Bachelor of Commerce (Finance)

Institution	University of Queensland, Australia
Date:	2006
Degree(s) or Diploma(s) obtained:	Bachelor of Economics (International Trade and Finance)

EMPLOYMENT HISTORY:

Date:	July 2014 to present
Location:	Toronto, Ontario, Canada
Company:	London Economics International LLC
Position:	Senior Consultant

Date:	2011 – 2014
Location:	Brisbane, Queensland, Australia
Company:	Marchment Hill Consulting

Position:	Consultant

Date:	2008 - 2011
Location:	Brisbane, Queensland, Australia
Company:	Alinta Energy
Position:	Regulatory Economist

Date:	2006 – 2008
Location:	Brisbane, Queensland, Australia
Company:	Deloitte (Australia)
Position:	Senior Analyst

SAMPLE PROJECT EXPERIENCE:

Date:	2014
Location:	Canada
Company:	Private client
Description:	Lance was a key project member responsible for analyzing the viability of using Henry Hub NYMEX Natural Gas Futures ("HH Natural Gas Futures) as a potential cross-hedge in managing electricity spot market risk associated with a transmission line development. LEI conducted a review of academic studies of cross hedges, and conducted regression analysis using ordinary least squares and error correction model techniques.

Date:	September 2014
Location:	Alberta, Canada
Company:	Private Client
Description:	Lance led the review of risk management and hedging practices for an Alberta energy supplier, providing meaningful insights with regards to the policy and underlying foundational assumptions behind the strategy. Analysis included quantification of the relationship between risks and hedging tools/assets.

Date:	2014 - Ongoing
Location:	Nova Scotia, Canada
Company:	Department of Energy
Description:	LEI was retained by the Department of Energy to perform a review of the organization and governance of electricity systems both cross-jurisdictionally and within the province of Nova Scotia. The scope of work was divided into two main phases: (i) Review of international best practices and lessons learned; and (ii) Translation of best practices and lessons learned into best fit for Nova Scotia. Lance is currently drafting the final working paper from the review analysing the governance options available to Nova Scotia.

Date:	2014
Location:	Ontario, Canada

Company:	Private Client
Description:	Lance participated in a high level feasibility study of the low carbon export potential from Canada into the United States. As part of the review, LEI analyzed the generation development potential across Canadian provinces, the levelized cost of the energy for various low carbon technologies in Canada and the associated revenue opportunities from US markets close to the border.

Date:	2014
Location:	Queensland, Australia
Company:	EnergyAustralia
Description:	Lance led the analysis and review of the Queensland regulated electricity retail price determination for 2014-15 on behalf of an Australian "gentailer". This included assessment of the methodology and individual components proposed in the determination and drafting a response to the regulator on behalf of the client.

Date:	2013-2014
Location:	Tasmania, Australia
Company:	Cradle Mountain Water (now TasWater)
Description:	Lance took a lead role in completing economic analysis of Tasmanian trade waste price structures for submission of a regulated price determination to State regulator. This included review of the current cost allocation methodology adopted by individual service providers prior to their amalgamation.

Date:	2013
Location:	Queensland, Australia
Company:	Private Client
Description:	Lance took a lead role in modeling new water and wastewater infrastructure developments and contract strategy on behalf of a new residential development. Key characteristics included: 35 year development plan, 19 precincts, c.60,000 EP Residential Water, c.118,000 EP Total Water, self sufficient water and wastewater supply/treatment.

Date:	2013
Location:	New South Wales, Australia
Company:	Alinta Energy
Description:	Lance prepared an independent review outlining the key regulatory risks facing the organisation as part of a broader debt restructuring process. The report was made available to investors and financiers of the organisation.

Date:	2013
Location:	Victoria, Australia
Company:	Origin Energy

Description:	Lance was seconded into Origin Energy's Risk Management team for a period of 5 months and designed, and supported the implementation of a retail compliance response encapsulating obligations for all business functions under National and State based legislation for the provision of energy retail services to customers.

Date:	2013
Location:	Queensland, Australia
Company:	Department of Energy
Description:	Lance, on behalf of the Queensland Department of Energy, led the review of alternative bulk water pricing / financing arrangements regarding climate resistant bulk water infrastructure in Australia and around the world. Here the infrastructure had been mothballed soon after commissioning requiring the government to look at alternative methods to recover its investment.

Date:	2013
Location:	Western Australia, Australia
Company:	Synergy
Description:	Lance to a lead role in review of the wholesale energy cost allocation methodology adopted by an energy retailer. This included review of the current internal transfer prices, load forecasts for the Franchise, Contestable and Competitive customer groups, wholesale energy contract books and testing of incremental and standalone cost of supply.

Date:	2012
Location:	Queensland, Australia
Company:	Government Owned Corporation
Description:	Lance was a key team member in the due diligence into the possible merger of three state owned corporations (two generators, one energy retailer). This included modeling of the forecast load and the ability of the individual generator portfolio's to serve at lowest cost of supply. Further to this work, an assessment of hypothetical "optimised" generation portfolio was presented to the client.

Date:	2012
Location:	Tasmania, Australia
Company:	Department of Finance
Description:	Lance led the review of the wholesale energy market risks underpinning energy retail sales on behalf of the Tasmanian Government. This review was completed as part of a broader electricity market reform process. The review included assessment of the forecast load and growth ambitions of the organisation, current wholesale contracting, and assessment of current risk management practices (including measurement of Value-at-Risk).

Date:	2012-2013
Location:	Queensland, Australia
Company:	Wide Bay Water Corporation

Description:	Lance completed an economic and financial assessment of alternative governance frameworks and operating models under National Competition Policy on behalf of a Queensland water and wastewater supplier.

Date:	2012-2013
Location:	Queensland, Australia
Company:	Wide Bay Water Corporation
Description:	Lance was responsible for the development of a long term financial model, providing revenue and tariff forecasts for a water and wastewater service provider. Key inputs into the forecasts include capital and operating expenditure programs.

Date:	2012
Location:	Western Australia, Australia
Company:	Private Client
Description:	Lance led the due diligence on behalf of the client regarding investment in physical generation (gas and diesel) and transmission assets, as well as various power purchase agreements offered by the clients counterparty.

Date:	2012
Location:	Western Australia, Australia
Company:	Private Client
Description:	Lance led the review of the electricity network access arrangements within the State and development of a coverage (access) application for submission to State government to secure access to a privately owned transmission network.

Date:	2008 – 2011
Location:	Australia
Company:	Alinta Energy
Description:	Lance was responsible for analysing and preparing Alinta Energy's response to energy policy, rule changes and regulatory reform processes including the Carbon Pollution Reduction Scheme, Electricity Sector Adjustment Scheme, Renewable Energy Target, Energy Efficiency Opportunities, Transmission Frameworks Review, and Scale Efficient Network Extensions.

Date:	2011
Location:	Australia
Company:	Alinta Energy
Description:	Lance was responsible for the preparation and submission of jurisdictional licence applications across the mainland National Electricity Market regions (5) for electricity and gas retailing.

Date:	2009
Location:	Queensland, Australia

Company:	Alinta Energy
Description:	Lance was responsible for forecasting the New South Wales Greenhouse Gas Scheme and Queensland Gas Scheme assets and liabilities of the organisation. The model was utilised to hedge the business exposure to fluctuations in certificate prices.

Date:	2008
Location:	Australia
Company:	Alinta Energy
Description:	Lance led the design, development and implementation of Alinta Energy's Regulation Compliance Program covering the National Electricity Law, National Electricity Rules and state based licensing and environmental market obligations across the company's portfolio of generation and retail assets.

Date:	2008
Location:	Western Australia, Australia
Company:	Western Power
Description:	Lance participated in the development of a long term financial model on behalf of a Western Australian electricity network service provider. The model enabled the assessment of multiple business case scenarios calculating the revenue and cost curves for the organisation and the associated network tariff structures including necessary regulatory adjustments.

Date:	2006 – 2007
Location:	New South Wales and Queensland, Australia
Company:	Energex & EnergyAustralia
Description:	Lance was a key team member in completing multiple limited assurance reviews, assisting in the preparation and submission of the electricity network service provider's regulated revenue proposals to the Australian Energy Regulator. These reviews measured compliance with the National Electricity Law and Rules.

Date:	2007 & 2008
Location:	Queensland, Australia
Company:	EnergyAustralia
Description:	Lance was a key team member in preparing financial and performance benchmarks of network service providers across the National Electricity Market. This included establishment of peer group and analytical framework for variance and value analysis.

Jawahar Shah

Consultant, London Economics International LLC

LONDON ECONOMICS

KEY QUALIFICATIONS:

Jawahar is a Consultant at London Economics International LLC's Boston office. He has over four years of experience in the energy sector, specializing in renewable energy projects. He has worked with project developers, utilities, regulators and international development banks in the US and India. Jawahar has experience modeling various types of renewable energy technologies, primarily large scale grid interactive solar PV plants and off-grid or distributed generation projects powered by solar PV, wind or biomass. He is proficient at evaluating the financial and economic viability of energy projects, and has conducted project level due diligence for the World Bank Group and the Asian Development Bank. In addition, Jawahar is also familiar with typical renewable energy incentives, policies and regulations in various markets and has worked on several projects involving policy and regulatory design and recommendations on market development for policymakers.

EDUCATION:

Institution	School of International & Public Affairs, Columbia University
Date:	May 2014
Degree(s) or Diploma(s) obtained:	MPA Energy and Management Policy

Institution	TERI University
Date:	May 2008
Degree(s) or Diploma(s) obtained:	Master of Business Administration

Institution	University of Delhi
Date:	May 2006
Degree(s) or Diploma(s) obtained:	BA Economics (Honors)

EMPLOYMENT RECORD:

Date:	June 2014 – Present
Location:	Boston, MA
Company:	London Economics International LLC
Position:	Consultant

Date:	January 2009 – January 2013
Location:	New Delhi, India
Company:	PricewaterhouseCoopers Pvt. Ltd. (PwC)

Position:	Senior Consultant (January 2012 – January 2013) Consultant (January 2009 – December 2011)

RECENT PROJECT EXPERIENCE:

Date:	2014
Location:	Canada
Company:	TransAlta
Description:	In the context of a regulatory investigation, helped a large utility in Alberta evaluate the impact of discretionary outages on certain coal-fired plants on the electricity forward prices in Alberta. Supported attorneys defending the utility during all phases of legal proceedings including crafting interrogatories, and preparing expert testimony.

Date:	June 2012 – December 2012
Location:	India
Company:	Ministry of New and Renewable Energy, Government of India
Description:	Designing the second phase of the National Solar Mission with an objective of achieving 5000 MW in solar installations by 2017. Conducted economic and financial due diligence on various regulatory incentive mechanisms to recommend a policy solution that can incentivize private investments. Designed a strategic business plan and rollout strategy for the Government of India and forecasted the economic, social and environmental impacts of the policy (regulatory impact analysis).

Date:	December 2011 – May 2012
Location:	Maldives
Company:	Government of Maldives and the World Bank Group
Description:	Designing Maldives' Low Carbon Growth Plan which included estimating the amount of renewable generation that can replace diesel generators on select islands. Conducted cost-benefit analysis of solar PV versus diesel generation on remote islands, including quantifying impacts of avoided emissions and other externalities. Estimating funds requirements and designing appropriate policy and regulatory mechanisms to attract foreign investments.

Date:	June 2011 - October 2011
Location:	India
Company:	Royal Norwegian Embassy and the British High Commission
Description:	Drawing from Phase I conducted in 2009, this project envisages the formation of an off-grid renewable energy grant fund to promote 1) solar lanterns, 2) home lighting systems and 3) village level mini-grids using renewable energy in various states in India. The fund focuses on providing pro-poor clean energy services using an auction-based performance linked bidding mechanism.

Date:	November 2010 – June 2011
Location:	India
Company:	Ministry of New and Renewable Energy, Government of India
Description:	The objective of the assignment was to assess the ability of the Indian financial sector to support the aims and objectives of the National Solar Mission. Deliverables included estimating year-wise investment requirements for meeting the solar installation targets and designing scenarios to forecast additional private sector funding requirements and recommending potential sources.

Date:	May 2010 - December 2010
Location:	India
Company:	Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)
Description:	The project aimed at introducing new technologies, business models and promotional programs for replacing fossil fuel use through solar energy in commercial and industrial applications. Activities performed included: design of a scoring matrix based on energy use and other parameters for short-listing 5 sectors for conducting study; mapping solar PV and thermal applications to industrial processes and requirements within the short-listed sectors; stakeholder consultation and discussion on potential applicability of proposed solar interventions and analysis of previous national and international case studies; cost-benefit and economic viability assessment of proposed solar interventions using excel modelling; strategies for scaling up solar applications in selected industrial applications and calculating national energy saving potential from proposed interventions.

Date:	March 2010 - September 2010
Location:	India
Company:	Rural Electrification Corporation, Government of India
Description:	Preparing Business Plan 2020 and Vision Document 2030 for Rural Electrification Corporation (REC) Ltd. including risk and competition analysis of renewable financing institutions, potential impact of government policies, regulations and financial sector evolution.

Date:	January 2010 – May 2010
Location:	India
Company:	Asian Development Bank
Description:	The assignment involved assessing the financial viability (IRR) using MS Excel® modeling, for a transmission line for a 500 MW solar park in Gujarat and evaluating the viability of different configurations of solar PV power plants. The assignment also involved organizing a workshop for 200 participants for promoting the solar park and highlighting ADB's role in its development during an investor summit in Gujarat in January 2011

Date:	October 2009 - December 2009
Location:	India
Company:	Philips
Description:	The project aimed at developing a comprehensive market assessment study for solar lighting applications in India covering Industry, Technology and Products, Supply Chain, Government Role and an analysis of existing industry players. Scope of work included a Cost-benefit and viability analysis of solar lighting options (portable lights and home lighting systems) against conventional options like diesel generators and grid electricity.

Date:	May 2009 - August 2009
Location:	Various locations in South Asia
Company:	Asian Development Bank
Description:	The objective of the assignment was to identify the enabling requirements for solar energy development with a view to promoting private sector participation, facilitating technology transfer, enhancing knowledge sharing, and strengthening investments in solar energy technologies in South Asian countries including Bangladesh, Sri Lanka, Nepal, Maldives and Bhutan.

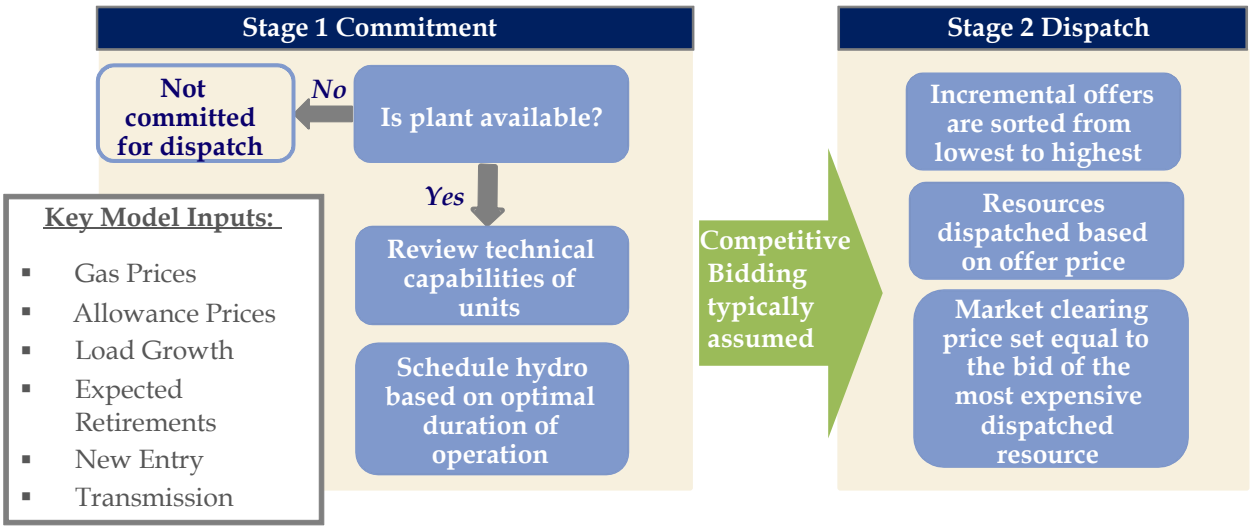
Date:	January 2009 - May 2009
Location:	India
Company:	The World Bank Group
Description:	The objective of this study was to set out a comprehensive economic framework that helps policy makers to take full account of the information available on costs and other aspects of different renewable energy technologies to deliver coherent policy, regulations, and guidelines for scaling up renewable energy development and supply in India

6 Appendix B: Overview of POOLMod

For the wholesale energy prices outlook, we will employ our proprietary simulation model, POOLMod, as the foundation for our electricity price forecast. POOLMod simulates the dispatch of generating resources in the market subject to least cost dispatch principles to meet projected hourly load and technical assumptions on generation operating capacity and availability of transmission.

POOLMod consists of a number of key algorithms, such as maintenance scheduling, assignment of stochastic forced outages, hydro shadow pricing, commitment, and dispatch. The first stage of analysis requires the development of an availability schedule for system resources. First, POOLMod determines a 'near optimal' maintenance schedule on an annual basis, accounting for the need to preserve regional reserve margins across the year and a reasonable baseload, mid-merit, and peaking capacity mix. Then, POOLMod allocates forced (unplanned) outages randomly across the year based on the forced outage rate specified for each resource.

Figure 11. POOLMod's two-stage process



POOLMod next commits and dispatches plants on a daily basis. Commitment is based on the schedule of available plants net of maintenance, and takes into consideration the technical requirements of the units (such as start/stop capabilities, start costs (if any), and minimum on and off times). During the commitment procedure, hydro resources are scheduled according to the optimal duration of operation in the scheduled day. They are then given a shadow price just below the commitment price of the resource that would otherwise operate at that same schedule (i.e., the resource they are displacing).

7 Appendix C: RFP Attachments

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Attachment 2: No Collusion Statement

Contract No. **STA15129PSCDPLSOSR**
Contract Title: Consulting Services to Review Utility Standard Offer Service Electricity Procurement

NO COLLUSION STATEMENT

This is to certify that the undersigned Vendor has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal, **and further certifies that it is not a sub-contractor to another Vendor who also submitted a proposal as a primary Vendor in response to this solicitation** submitted this date to the State of Delaware, Public Service Commission

It is agreed by the undersigned Vendor that the signed delivery of this bid represents the Vendor's acceptance of the terms and conditions of this solicitation including all specifications and special provisions.

NOTE: Signature of the authorized representative **MUST** be of an individual who legally may enter his/her organization into a formal contract with the State of Delaware, Public Service Commission.

	Corporation
✓	Partnership
	Individual

COMPANY NAME: **London Economics International LLC**

NAME OF AUTHORIZED REPRESENTATIVE: **Amit Pinjani**

SIGNATURE: TITLE: **Managing Consultant**

COMPANY ADDRESS: **717 Atlantic Avenue, Suite 1A Boston, MA 02111**

PHONE NUMBER: **416-643-6621** FAX NUMBER: **416-643-6611**

EMAIL ADDRESS: amit@londoneconomics.com

FEDERAL E.I. NUMBER: **043544420** STATE OF DELAWARE LICENSE NUMBER: **N/A**

COMPANY CLASSIFICATIONS:	Certification type(s)	Circle all that apply
	Minority Business Enterprise (MBE)	NO
CERT. NO.:	Woman Business Enterprise (WBE)	NO
	Disadvantaged Business Enterprise (DBE)	NO
	Veteran Owned Business Enterprise (VOBE)	NO
	Service Disabled Veteran Owned Business Enterprise (SDVOBE)	NO

PURCHASE ORDERS SHOULD BE SENT TO: **London Economics International LLC**

ADDRESS: **717 Atlantic Avenue, Suite 1A Boston, MA 02111**

CONTACT: **Amit Pinjani**

PHONE NUMBER: **416-643-6621** FAX NUMBER: **416-643-6611**

EMAIL ADDRESS: amit@londoneconomics.com

AFFIRMATION: Within the past five years, has your firm, any affiliate, any predecessor company or entity, owner, Director, officer, partner or proprietor been the subject of a Federal, State, Local government suspension or debarment?

NO

THIS PAGE SHALL HAVE ORIGINAL SIGNATURE, BE NOTARIZED AND BE RETURNED WITH YOUR PROPOSAL

SWORN TO AND SUBSCRIBED BEFORE ME by Amit Pinjani

this 15th day of January 20 15

Notary Public

My commission expires N/A

City of Toronto

~~County~~ Regional Municipality of Toronto ~~State~~ Province of Ontario

RED SEAL NOTARY INC.
25 ADELAIDE ST. EAST.
TORONTO ON M5C 3A1
(888) 922-7325
www.redsealnotary.com

Attachment 3: Exception Form

Contract No. **STA15129PSCDPLSOSR**
Contract Title: Consulting Services to Review Utility Standard Offer Service Electricity Procurement

EXCEPTION FORM

Proposals must include all exceptions to the specifications, terms or conditions contained in this RFP. If the vendor is submitting the proposal without exceptions, please state so below.

☑ By checking this box, the Vendor acknowledges that they take no exceptions to the specifications, terms or conditions found in this RFP.

Paragraph # and page #	Exceptions to Specifications, terms or conditions	Proposed Alternative
D. 7 f 3 – page 27	LEI currently carries insurance for $1,000,000 per occurrence / $2,000,000 aggregate	
D. 7 s – page 30	Specifications to be discussed with the PSC if LEI is the successful proponent.	
E1 – page 33	Specifications to be discussed with the PSC if LEI is the successful proponent.	

Note: use additional pages as necessary.

Attachment 4: Confidential Information Form

Contract No. **STA15129PSCDPLSOSR**
Contract Title: Consulting Services to Review Utility Standard Offer Service Electricity Procurement

CONFIDENTIAL INFORMATION FORM

☑ By checking this box, the Vendor acknowledges that they are not providing any information they declare to be confidential or proprietary for the purpose of production under 29 Del. C. ch. 100, Delaware Freedom of Information Act.

Confidentiality and Proprietary Information

Note: use additional pages as necessary.

Attachment 5: Business References

Contract No. **STA15129PSCDPLSOSR**
Contract Title: Consulting Services to Review Utility Standard Offer Service Electricity Procurement

BUSINESS REFERENCES

List a minimum of three business references, including the following information:

- Business Name and Mailing address
- Contact Name and phone number
- Number of years doing business with
- Type of work performed

Please do not list any State Employee as a business reference. If you have held a State contract within the last 5 years, please provide a separate list of the contract(s).

Reference 1	
Contact Name & Title:	Donald Downes, Former Chairman
Business Name:	Connecticut Department of Public Utility Control
Address:	389 Shuttle Meadow Avenue, New Britain, CT 06052
Email:	
Phone # / Fax #:	Phone: 860-224-4663
Current Vendor (YES or NO):	No
Years Associated & Type of Work Performed:	In 2006-2007, LEI oversaw DPUC's legislated mandate to reduce Federally Mandated Congestion Costs in the state through organization of an all-source competitive solicitation for new resources. Julia Frayer has also previously served as monitor for Connecticut transitional standard offer auction for Connecticut Light and Power in 2004 and 2005.

Reference 2	
Contact Name & Title:	Faith Huntington, Director of Electricity and Natural Gas MPUC
Business Name:	Maine Public Utilities Commission
Address:	242 State Street, State House Station 18, Augusta, ME 04333
Email:	
Phone # / Fax #:	Phone: (207) 287-1373
Current Vendor (YES or NO):	No

Years Associated & Type of Work Performed:	LEI team assisted the Commission on the RFP related to the procurement of electricity in response to statutory mandates and state policy preferences. LEI provided economic analyses of bid proposals by estimating the benefits and costs to the ratepayers, and are currently supporting Commission staff in negotiations with short-listed bidders. LEI has also worked with the Commission on project involving the state's RPS and transmission costs allocation.

Reference 3	
Contact Name & Title:	Grant Weismiller, Director, Regulatory Affairs
Business Name:	Enmax Corporation
Address:	141 - 50 Ave SE Calgary, AB T2G 4S7 Canada
Email:	
Phone # / Fax #:	
Current Vendor (YES or NO):	(403) 514-3105
Years Associated & Type of Work Performed:	LEI team has assisted ENMAX on numerous regulatory filings and strategic advisory work over a period of more than 7 years. Most recently, LEI was retained by ENMAX as an independent expert in on matters related to proposed auctioning for the Load Following Service ("LFS") product in a regulated rate option (RRO) proceeding in front of the Alberta Utilities Commission.

Attachment 9: Employing Delawareans Report

Contract No. **STA15129PSCDPLSOSR**
Contract Title: Consulting Services to Review Utility Standard Offer Service Electricity Procurement

EMPLOYING DELAWAREANS REPORT

As required by House Bill # 410 (Bond Bill) of the 146th General Assembly and under Section 30, No bid for any public works or professional services contract shall be responsive unless the prospective bidder discloses its reasonable, good-faith determination of:

1. Number of employees reasonable anticipated to be employed on the project: **Five**

2. Number and percentage of such employees who are bona fide legal residents of Delaware: **Zero**

   Percentage of such employees who are bona fide legal residents of Delaware: **Zero**

3. Total number of employees of the bidder: **30**

4. Total percentage of employees who are bona fide resident of Delaware: **Zero**

If subcontractors are to be used:

1. Number of employees who are residents of Delaware: **N/A**

2. Percentage of employees who are residents of Delaware: **N/A**

"Bona fide legal resident of this State" shall mean any resident who has established residence of at least 90 days in the State.