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IN THE MATTER OF AN ARBITRATION UNDER CHAPTER ELEVEN OF THE NORTH AMERICAN FREE TRADE AGREEMENT AND THE UNCITRAL ARBITRATION RULES

BETWEEN:

MESA POWER GROUP, LLC

Claimant

AND:

GOVERNMENT OF CANADA

Respondent

Expert Report of Seabron C. Adamson

April 27, 2014

Charles River Associates
200 Clarendon Street, T-32
Boston, MA 02116

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I. Introduction

1. My name is Seabron Adamson. I am a Senior Consultant associated with the Energy Practice of Charles River Associates ("CRA"). My business address is 200 Clarendon Street, T-32, Boston, MA 02116. [redacted]

A. Purposes of the Report

2. I have been asked by counsel for Mesa Power Group, LLC ("Mesa") to comment on several economic and policy issues relating to a dispute between Mesa and the Government of Canada regarding competition to obtain contracts to supply wind energy (Power Purchase Agreements or "PPAs") in the Province of Ontario.

3. During the period in question in Ontario, renewable energy PPAs were offered under a feed-in tariff mechanism. A feed-in tariff is a mechanism under which long term PPAs (typically 15-20 years) are offered to suppliers at pre-determined fixed prices. Since prices are fixed under the type of mechanism, the competition is to secure quantities of PPAs in order to make sales. In Ontario, a major constraint on securing PPAs to sell wind energy was securing transmission capacity.

4. Starting in 2009, Ontario commenced its Feed-In Tariff ("FIT") program.[1] Mesa was one of a number of competitors who sought to obtain PPAs through the FIT process. In January 2010, the Government of Ontario signed the Green Energy Investment Agreement ("GEIA") with a consortium of two Korean firms,[2] Samsung C&T Corporation ("Samsung") and Korea Electric Power Corporation ("KEPCO"), or jointly the "Korean Consortium".

5. The GEIA was an alternative feed-in tariff, again offering long-term PPAs at fixed prices. The GEIA offered an alternative method to obtain PPAs for the Korean Consortium and its local joint venture partner, Pattern Energy. Unlike the general FIT program, however, the GEIA was exclusively limited to the Korean Consortium.

6. I understand that a major issue in the current dispute is the nature of the competitive circumstances between Mesa (operating under the FIT program), and the Korean Consortium and Pattern Energy (operating under the GEIA). I believe that one key issue is whether the manufacturing commitments of the GEIA place the Korean Consortium in different circumstances to Mesa and other FIT participants. I also understand that the comparative treatment of competitors under GEIA versus FIT is also a matter of controversy.

7. In particular, I have been asked to comment on the economic and financial aspects of:

[1] Through the remainder of this report, the use of the capitalized Feed-In Tariff or FIT acronym will refer to the specific program and its rules in Ontario during this period.

[2] Green Energy Investment Agreement, January 21, 2010 ***(Investor's Schedule of Exhibits at C-0322)***

- The financial and economic obligations of the Korean Consortium under the GEIA.
- The nature of the competition conditions between Mesa and the Korean Consortium and its development partner to supply wind energy under long-term PPAs in Ontario.
- The relative financial treatment of Mesa and the Korean Consortium with respect to the benefits and obligations under the FIT program for Mesa and the GEIA for the Korean Consortium.
- The disposition of energy and environmental attributes from the wind facilities under GEIA and FIT.
- Issues associated with transmission availability in the FIT program and changes in transmission connection point rules.

8. The remainder of this report, excluding this Introduction, is organized in five main sections, each discussing one of the major topics listed above. Section II addresses the obligations under the GEIA. Section III discusses the competitive conditions between Mesa and the Korean Consortium. In Section IV, I discuss the relative treatment of Mesa and the Korean Consortium under the respective programs. Section V discusses how the GEIA greatly reduced risks for the Korean Consortium in comparison to FIT. Section VI discusses the disposition of wind energy and environmental attributes under the PPAs. In Section VII I discuss some transmission availability data and rules issues under the FIT program.

9. I have reviewed a range of documents and public information in preparing this Report. I reserve the right to revise my report and conclusions if additional information becomes available.

B. Qualifications

10. I have over 20 years of consulting and investment experience with electricity and other energy markets, extending across the United States, Canada, the European Union, and in Asia. I have advised companies, investors and governments on issues of market design, investment analysis and due diligence, regulation and policy and litigation support.

11. I am currently a Senior Consultant to Charles River Associates, a major international economics consulting firm. I have worked with a range of clients on power and gas market issues. I was a Vice President of Charles River Associates from 2004 to 2008, also in the Energy practice. From 2006 to 2008 I was co-Head of the Energy practice at the firm. In this role I led a team of 15-20 professionals in the Enterprise and Asset Investment segment of the Energy practice. In this role I advised major private equity funds, hedge funds, and investment and commercial banks on investments in the energy sector. Prior to joining CRA, I was a director at Tabors Caramanis and Associates which was acquired by CRA in 2008. I previously had been a co-founder of the London-based Frontier Economics Group, and led the firm's U.S. business. I started my consulting career in the United Kingdom with London Economics in 1992. I later started the North American business of London Economics which was active in U.S. and Canadian power sector restructuring

efforts. From 2008 to 2010 I was a power and gas analyst and strategist for Tudor Investment Corporation, a major global alternative investment firm.

12. I have worked extensively on power market issues in Ontario, for a wide range of clients including utilities, generators, the Independent Electricity System Operator ("IESO"), and financial investors. I have testified before the Ontario Energy Board ("OEB") on retail market and distribution ratemaking issues. I have also worked with a range of generation and retailer clients on various policy and market rules issues, as well as assisting a major global infrastructure fund analyze plant contracts and opportunities in Ontario.

13. I have also extensive experience with renewable energy projects in various jurisdictions. I have advised wind developers, lenders and buyers of renewable energy on transmission, financing and regulatory matters associated with wind projects.

14. I received the B.S. and M.S. degrees in Physics and Applied Physics from the Georgia Institute of Technology. I received the S.M. degree from the Massachusetts Institute of Technology in Technology and Policy in 1992, with a focus on energy and environmental policy. In 2007 I received the M.A. degree in Economics from Boston University.

15. In addition to my consulting work and other interests, I am an adjunct faculty member of the A.B. Freeman School of Business at Tulane University, and a research associate of the Tulane Energy Institute. In this role, I have taught classes on energy trading, risk and portfolio management. I have also

published articles on power markets in academic journals and co-authored a chapter in a recent book on financial transmission rights markets.

16. My CV is attached as Appendix B.

II. Investment and Job Creation Obligations Under the GEIA

17. The GEIA was announced by the Minister of Energy on January 21, 2010. [3] The Ministry of Energy claimed at that time that the GEIA would create 16,000 jobs in Ontario and the very title of its press backgrounder document was "Ontario Delivers $7 Billion Green Investment".

18. The Ministry of Energy also stated that the payment of the Economic Development Adder to the Korean Consortium (which was in addition to the payments under the FIT pricing schedule), and the assurance of priority transmission access was contingent on the delivery of four manufacturing plant commitments.

19. The GEIA created an alternative feed-in tariff mechanism for wind and solar energy in Ontario. The GEIA and FIT are very similar programs. In each the Ontario Power Authority ("OPA") is the counterparty for long-term, fixed price PPAs. As I show in Section III, the product (wind energy) and the contractual terms under both programs are similar or identical. In the remainder of this section, I show that the manufacturing commitments of the Korean Consortium, heralded by Canada as the basis of the superior treatment of Canada under the GEIA, amount to little or nothing more than the domestic content requirements imposed on FIT participants such as Mesa.

[3] Ministry of Energy Archived Backgrounder, "Ontario Delivers $7 Billion Green Investment", January 21, 2010, ***(Respondent's Schedule of Exhibits at R-076)***

A. Exclusive and Confidential Development of the GEIA

20. The GEIA grew out of long-running interactions between the Korean Consortium and the Government of Ontario. On December 12, 2008, Ontario and the Korean Consortium signed a Memorandum of Understanding ("MOU") as a statement of intention with the respect to wind and solar generation in the Province.[4]

21. Many of the statements of intent in the MOU were non-binding.[5] However two significant provisions were not. First, Ontario and the Korean Consortium agreed to negotiate exclusively with each other.[6] Second, the parties to the MOU agreed to keep all information about the MOU, including the contents and the execution of the MOU itself, strictly confidential.[7]

22. The MOU was followed on September 25, 2009 by a Framework Agreement between the Government of Ontario and the Korean Consortium ("Framework Agreement"). I have not seen a complete and executed version of the Framework Agreement. My comments which follow rely on a Draft Framework Agreement of September 25, 2009. If an executed version of this agreement is produced, I reserve the right to review and change my report accordingly.

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[4] Memorandum of Understanding by and Among The Ministry of Energy and Infrastructure and Korea Electric Power Corporation and Samsung C&T Corporation, December 12, 2008, ***(Investor's Schedule of Documents at C-0536)***

[5] Memorandum of Understanding by and Among The Ministry of Energy and Infrastructure and Korea Electric Power Corporation and Samsung C&T Corporation, December 12, 2008, at Section 5.3 ***(Investor's Schedule of Documents at C-0536)***

[6] Memorandum of Understanding by and Among The Ministry of Energy and Infrastructure and Korea Electric Power Corporation and Samsung C&T Corporation, December 12, 2008, at Section 4.1 ***(Investor's Schedule of Documents at C-0536)***

[7] Memorandum of Understanding by and Among The Ministry of Energy and Infrastructure and Korea Electric Power Corporation and Samsung C&T Corporation, December 12, 2008, at Section 5.1 ***(Investor's Schedule of Documents at C-0536)***

[redacted]

23. The exclusive nature of the MOU, the Framework Agreement and the GEIA, along with the strict confidentiality provisions in the MOU and Framework Agreement clearly prevented any competing entities (such as Mesa and its partners) from entering into the same economic transaction. Instead, the Korean Consortium entered into an exclusive relationship with a FIT Applicant, Pattern Energy, to act as the Consortium's Ontario wind development partner for the first 1000 MW of wind projects.[10]

24. The GEIA created an exclusive relationship between the Government of Ontario and the Korean Consortium under provisions of strict confidentiality. The exclusive relationship between Samsung and Pattern Energy then extended this relationship into the wind development sector. These

[8] Draft Framework Agreement by and Among Her Majesty The Queen in Right of Ontario, Korean Electric Power Corporation and Samsung C&T Corporation, September 25, 2009 Article 14.1 ***(Investor's Schedule of Exhibits at C-0328)***

[9] Draft Framework Agreement by and Among Her Majesty The Queen in Right of Ontario, Korean Electric Power Corporation and Samsung C&T Corporation, September 25, 2009 Article 1.1 ***(Investor's Schedule of Exhibits at C-0328)***

[10] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 63 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0537)***

relationships acted to exclude FIT Applicants such as Mesa from the benefits extended by the Government of Ontario to the Korean Consortium.

B. Economic Framework for Analyzing the GEIA

25. I understand that Canada has dismissed any comparison of treatment between GEIA and FIT based on a theory that the manufacturing obligations of the Korean Consortium under the GEIA make supply of wind energy under the GEIA fundamentally different than supply of wind energy under the FIT program.

26. From an economic perspective, the theory advanced by Canada is essentially one of exchange of obligations and benefits. If the GEIA imposed costly burdens on the Korean Consortium, superior treatment (eg, higher prices through an Economic Development Adder and priority transmission access) could make economic sense. Under this hypothetical scenario, the GEIA would have imposed substantial costs and investment requirements on the Korean Consortium, who would then be compensated for those obligations through superior treatment.

C. Economic Analysis of the GEIA Obligations

27. In the remainder of this section, I examine the specific economic and financial burdens imposed by the GEIA with respect to investment on the Korean Consortium.

28. First, it is noteworthy that Section 8.1 of the GEIA requires no investments to be made or new plants built, only that the “Korean Consortium will endeavour

on a *commercially reasonable basis* to bring Manufacturing Plants to the Ontario [sic] for the Components,…".[11] It is of course quite likely that manufacturing facilities for these components would have been attracted to the Province anyway, given the scale of the announced wind and solar programs (even under the FIT program alone) and the requirement for Domestic Content (discussed in more detail below). These domestic content obligations all but guaranteed that new solar and wind equipment manufacturing was required in Ontario.

29. Section 8.5 of the GEIA states that the Korean Consortium estimates that 900 jobs will be created from the Manufacturing commitment, but places no contractual requirement to create employment on the Korean Consortium. There is also no explicit requirement for the Korean Consortium to invest at all directly in Manufacturing Plants.[12]

30. To supply wind or solar energy – regardless of whether under FIT or GEIA – clearly requires the use of specialist equipment. Both programs require substantial amounts of that equipment to be purchased from suppliers in Ontario, under minimum Domestic Content rules. The Korean Consortium could have found it commercially reasonable to manufacture such equipment, or to buy it from another party. This common "make or buy" decision is a

[11] Green Energy Investment Agreement, January 21, 2010, Section 8.1 ***(Investor's Schedule of Exhibits at C-0322)*** Emphasis added.

[12] The "Amended and Restated GEIA" ("Amended GEIA") between the Korean Consortium and the Government of Ontario dated June 20, 2013 ***(Respondent's Schedule of Exhibits at R-133)***, provided for a more explicit reporting and documentation process for the number of jobs at each of the Manufacturing Plants run by a Manufacturing Partner.

classic one in organizational economics. But a requirement on a wind project developer to do what is in its own commercially reasonable interest is not surprising.

31. Section 8.4 of the GEIA defines eligibility for the Economic Development Adder and the priority access to the Bulk Transmission System for Phases 2 to 5 for the Korean Consortium.[13] To be eligible for the Economic Development Adder and priority transmission access in later phases, the Korean Consortium has to inform the Government of Ontario of its designation of each Manufacturing Partner for the four components and provide documentation of its Manufacturing commitment, such as agreements or memoranda.

32. Section 8.4 of the GEIA nowhere requires that the Korean Consortium undertake any manufacturing of components in Ontario, or indeed to make any capital investment themselves to do so. The sole requirement of Section 8.4 (and hence be eligible to receive the Economic Development Adder and priority transmission access), is that the Korean Consortium designate a Manufacturing Partner for each component. This last term is defined as a "person who Manufactures a Component, as may be identified by the Korean Consortium."

33. To designate a Manufacturing Partner in itself requires no investment of capital, no substantial expenditure of labor or funds, only a designation which

[13] Green Energy Investment Agreement, January 21, 2010, Section 8.4 ***(Investor's Schedule of Exhibits at C-0322)***

can be documented in Section 8.4 though an agreement, memoranda or other relevant document. The required content of such an agreement is not specified in the GEIA. I understand that such documents have not been produced by Canada in this dispute. Such documents are relevant for understanding what the Korean Consortium did in exchange for its benefits under the GEIA, and are called for under the GEIA. In their absence, I can only rely upon evidence produced in the deposition of Mr. Colin Edwards of Pattern Energy, where he states that Samsung (or any member of the Korean Consortium) was not an investor in Ontario manufacturing or associated with these manufacturing companies.[14]

34. Section 9.2 of the GEIA requires that the "Korean Consortium or the Project Company shall be required to achieve Domestic Content requirements as required by the FIT Rules". The FIT Rules (version 1.5), for example, require that all wind power projects greater than 10 kW Contract Capacity, achieve a minimum percentage of Domestic Content Level, as specific in the FIT contract.[15] The FIT Contract, in Table 1, in turn, provides the qualifying percentages used for each designated activity and component and the specific action needed (e.g. casting of turbine wind blades in a mould) to have

[14] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC,* at p. 31 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0537)***

[15] Ontario Power Authority, FIT Rules Version 1.5, Section 6.4, June 3, 2011 ***(Investor's Schedule of Exhibits at C-0005)***

been conducted in Ontario. In his deposition Mr. Edwards confirmed that the Domestic Content provisions of the GEIA and FIT PPAs were very similar.[16]

35. Consider now the basic facts of the situation. First, to get special transmission access, a better price (through the Economic Development Adder) and other special treatment, the Korean Consortium under the GEIA was merely required to provide documentary evidence that it has designated a Manufacturing Partner making each of the components. The nature of that agreement is not specified, and the Manufacturing Partner may in fact be simply a vendor of components or equipment.

36. Second, to construct wind farms (as required to supply wind energy under both the GEIA and the FIT PPAs), a developer would need these components and equipment.

37. Third, the FIT and GEIA PPAs required that a substantial amount of that equipment be Domestic Content produced in Ontario, so a commercial agreement of some form with an Ontario manufacturer was inevitable. If designating such an Ontario vendor is sufficient to meet the Manufacturing Partner designation requirement of Section 8.4, the Korean Consortium may have fulfilled its GEIA Manufacturing Commitments, having made no direct capital investments in manufacturing at all.

[16] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC,* at p. 197 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0537)***

38. In his deposition, Colin Edwards, head of the Canadian office of Pattern Energy, Samsung's partner in developing many of the wind farm projects included under the GEIA, confirmed that he was unaware of any suggestions that Samsung or other members of the Korean Consortium (or Pattern itself) would ever themselves invest in any manufacturing facilities in Ontario.[17]

39. The FIT and GEIA programs *both* effectively required substantial new manufacturing capacity in Ontario for renewable energy components, and so both stimulated new manufacturing facilities. Such components were not in widespread production in Ontario before FIT, and together the sheer scale of the FIT and GEIA programs (which both had large domestic content requirements) would have required new manufacturing capacity in Ontario to be built.

40. Samsung has announced its four manufacturing partners in Ontario under the GEIA: Siemens, CS Wind, SMA and Canadian Solar.[18] Canadian Solar and Siemens have opened facilities in Ontario, at least partially to supply Samsung projects.[19]

41. But demand for components from the even larger FIT program has also directly stimulated new manufacturing capacity in Ontario. For example, Canadian Solar launched a strategic partnership with Satcon as early as

[17] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 31 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0537)***

[18] Samsung Website, "Samsung Renewable Energy signs manufacturing partnership agreement with Canadian Solar Inc.", June 26, 2013, ***(Investor's Schedule of Exhibits at C-0593)***

[19] Siemens Wesbite, "Siemens selects Tillsonburg, Ontario, as new home for Canadian wind turbine blade manufacturing facility", December 2, 2010, ***(Investor's Schedule of Exhibits at C-0594)***

October 2009 to supply solar systems to meet FIT domestic content requirements.[20] In December 2009 Canadian Solar announced its intent to build a solar panel manufacturing facility in Ontario to supply the FIT market, expecting to create 500 jobs.[21] Canadian Solar – Samsung's designated partner under GEIA – was also awarded its own 176 MW solar project by the OPA under the FIT program.[22]

42. Other manufacturers not connected to the Korean Consortium have also announced plans to build renewable energy manufacturing facilities in Ontario. For example, in December 2012 Repower Systems SE (a German unit of Suzlon Energy Ltd. now known as Senvion) announced plans to build a new factory in Ontario. This facility in Welland, Ontario will employ 200 people and supply rotor blades for six projects developed by WPD in Ontario.[23] The six WPD projects have FIT contracts with the OPA.[24] In October 2012 GE announced plans to build wind turbine hubs in Peterborough, Ontario to meet domestic content requirements under the FIT program.[25]

[20] Canadian Solar Press Release, "Canadian Solar and Satcon Launch First Strategic Partnership Meeting Ontario's Feed-in-Tariff Domestic Content Requirements", October 2, ***(Investor's Schedule of Exhibits at C-0595)***

[21] Canadian Solar Press Release, "Canadian Solar Announces Intention to Build Solar Panel Manufacturing Facility in Ontario", December 3, ***(Investor's Schedule of Exhibits at C-0596)***

[22] Canadian Solar Press Release, "Canadian Solar Awarded Contract Offers for 176 MW (AC) of Distributed Solar Power Projects by Ontario Power Authority via Feed-in-Tariff Program", April 13, 2010, ***(Investor's Schedule of Exhibits at C-0597)***

[23] Sally Bakewell, Bloomberg News, "Suzlon's Repower Unit Wins 105-Megawatt Turbine Order in Canada", December 17, 2012, ***(Investor's Schedule of Exhibits at C-0598)***

[24] Wind Power Monthly Website, "Repower announces Ontario factory location", May 1, 2013, ***(Investor's Schedule of Exhibits at C-0599)***

[25] Wind Power Monthly Website, "GE extends wind turbine manufacturing in Ontario", October 16, 2012, ***(Investor's Schedule of Exhibits at C-0600)***

43. I conclude that given their scale and identical domestic content requirements, both GEIA and FIT required new manufacturing capacity in Ontario. The primary difference between the two programs is that the Korean Consortium was obligated to designate its suppliers as “Manufacturing Partners” rather than mere vendors, but this appears to be a distinction without a real economic difference.

44. The “Manufacturing Commitment” required in GEIA section 8.4 would therefore appear to impose little or no additional financial burden on the Korean Consortium. The only requirement is to designate as “Manufacturing Partners” the Ontario vendors that would be required anyway to meet PPA Domestic Content requirements.

45. Hence I conclude that the economic exchange required in the GEIA is very one-sided. In return for the Economic Development Adder (estimated at the time by the Ministry of Energy to have a value of $437 million) the Korean Consortium was required to sign contracts with equipment suppliers it would have had to have signed anyway to meet the Ontario minimum domestic content rules to obtain PPAs.

46. An economic theory of superior treatment under GEIA over FIT in return for compensating additional investment obligations can therefore be rejected. GEIA’s Manufacturing Commitment - the requirement to designate Manufacturing Partners through agreements to supply essential components - appears in practice to be little or no different than the need for every FIT

developer to have local component suppliers under the FIT rules. The substantially superior treatment afforded to the Korean Consortium in comparison to the FIT participants was not justified by the specific manufacturing requirements of the GEIA. The GEIA simply provides better treatment than the FIT.

III. Competitive Circumstances Between Mesa and the Korean Consortium

47. In the previous section the Manufacturing Obligations of the GEIA were analyzed, and I concluded that the economic differences between the GEIA and the FIT programs showed no clearly discernible economic differences, based on the actual requirements to secure equipment and domestic content rules.

48. While this is important, it itself does not establish that Mesa and the Korean Consortium were in like competitive circumstances. Other differences could exist, in terms of the product sold, contractual terms, scale, and other factors. In this section I examine each of these to determine if there are meaningful differences between wind energy sold under GEIA and FIT PPAs.

A. Wind Power as a Product

49. Wind energy shares the general characteristics of all energy injected into a high voltage electricity grid, with a few special features of its own. As described by Dr. William Hogan in a report filed by Canada before the World Trade Organization ("WTO") in *Canada – Renewable Energy*, the flow of electricity produced by wind and other renewable resources in the grid is indistinguishable from that of other types of generators.[26] Once generated electricity has been injected into the grid, the power flowing from all types of

[26] "Overview of the Electricity System in the province of Ontario", by William W. Hogan ("Hogan Report"), March 28, 2013, at p. 10 ***(Investor's Schedule of Exhibits at C-0320).*** Filed by the Government of Canada before the World Trade Organization

generators (including FIT and GEIA wind generators alike) is subject to the same physical laws.

1. Intermittent nature of wind generation

50. As also explained by Dr. Hogan, wind energy has a cost structure that differs from conventional generation.[27] Virtually all of the costs of renewable energy facilities such as wind turbines arise from capital costs and fixed operating costs that do not vary with the level of energy output, as fuel costs are zero. This is true for all wind turbine technologies and does not differ between FIT and GEIA, which use similar or identical technologies.

51. All wind resources are intermittent (sometimes referred to as "non-dispatchable"). They can generate only when the wind blows. This too is common to FIT and GEIA wind projects.

52. Electrically, all electricity generated from wind power is the same. All power flows though a high voltage transmission system, such as Ontario's IESO-controlled transmission grid, is produced using similar or identical technologies, and has identical value to users. There is therefore no technical reason to discriminate between different sources of wind generation, such as FIT versus GEIA projects.

[27] "Overview of the Electricity System in the province of Ontario", by William W. Hogan ("Hogan Report"), March 28, 2013, at p. 6 ***(Investor's Schedule of Exhibits at C-0320)***

2. Transmission constraints and interconnection

53. Although electricity once in the grid flows almost instantaneously, the grid cannot transmit power from any source (e.g., a generator such as a natural gas-fired plant or a wind farm) to any load without limit. A high voltage transmission system such as the IESO grid has a complex set of constraints on how much power can flow across any grid element at any time. This requires a grid operator such as the IESO to make constant adjustments in output to ensure that power flows across elements of the grid (which arise in many cases from multiple sources, and not just one source of generation) do not exceed engineering tolerances. These constraints affect all sources of generation, including all wind generation.

54. In order to ensure a reliable system, given expected transmission constraints, a grid operator such as the IESO cannot allow generators to connect at will; the resulting patterns of generation would very likely create power flows that would breach transmission constraints at some times. To ensure reliability, grid operators will allow new generation to connect only when and where sufficient transmission capacity is available, given expected loads, flows and the siting of existing generation.

55. Transmission capacity and interconnection rights therefore have a value for any type of generator; since without it no power can be sold either under contract or into the spot market. This is true for both FIT and GEIA wind projects in Ontario, although the method of allocating such transmission capacity is different between GEIA and FIT. Under GEIA, the Korean

Consortium is still required to seek System Impact Assessments and Customer Impact Assessments required for the connection of new generation on the transmission system.[28] This is parallel to the requirements in the FIT Rules requiring an Impact Assessment after executing a FIT contract.[29]

3. IESO Operations

56. Both FIT and GEIA wind projects, which operate under substantially the same contract form, produce and sell power to the grid under the rules of the IESO.[30] Once a wind project enters into commercial operation, its output into the IESO Grid is under the control of the IESO, as it is for all other large-scale generation in the Province. For example, transmission or load constraints can in some circumstances cause system operators such as the IESO to require that the output of a wind farm be curtailed, in order to protect system reliability. This risk is faced equally by GEIA and FIT projects,

4. Conclusions on technical characteristics of FIT versus GEIA wind generation

57. The generation from FIT and GEIA wind projects is electrically indistinguishable. It is generated using the same basic technology, flows through the same IESO grid, and is intermittent in nature. The IESO imposes the same technical requirements on interconnection, as does the

[28] Green Energy Investment Agreement, January 21, 2010, at Section 7.5 ***(Investor's Schedule of Exhibits at C-0322)***
[29] Ontario Power Authority, FIT Rules Version 1.5, June 3, 2011, at Section 3.2 ***(Investor's Schedule of Exhibits at C-0005)***
[30] Green Energy Investment Agreement, January 21, 2010, at Section 7.1.1(a) ***(Investor's Schedule of Exhibits at C-0322)***

transmission system owner. I therefore conclude that FIT and GEIA projects compete to deliver the same product.

B. FIT and GEIA PPA contracts

58. Wind PPAs typically share a wide set of characteristics, which reflect the nature of the product and the method under which it is sold. These include standard contractual provisions such as term, pricing and performance, as well as power market-specific aspects such as market settlements and output metering.

1. Contract form and pricing

59. Section 9.1 of the GEIA states that the GEIA PPA "shall be substantially in the form of the FIT Contract in use by the OPA at the time, such PPA being entered into as amended to give effect to the terms and conditions of this Agreement …."[31] Both GEIA and FIT Contracts are for 20 year terms.

60. For wind projects under the GEIA, the subject of this dispute, the base price is specified as the current OPA Price Schedule, which also applies to the FIT PPAs.[32] In addition, as discussed in more detail below, the Korean Consortium is entitled under the GEIA to the Economic Development Adder plus "any other adder to which the Project Company would be entitled had it made application for a FIT Contract pursuant to the FIT Rules".

[31] Green Energy Investment Agreement, January 21, 2010. at Section 9.1 ***(Investor's Schedule of Exhibits at C-0322)***

[32] Green Energy Investment Agreement, January 21, 2010, at Section 9.1(a) ***(Investor's Schedule of Exhibits at C-0322)***

2. Domestic Content rules

61. The FIT Contract requires a certain level of Domestic Content for wind projects under the FIT program.[33] This includes a list of Designated Activities for various aspects of wind turbine systems, components, towers, construction etc., and a corresponding Qualifying Percentage for each activity. The Domestic Content Level of a FIT Contract Facility is calculated by summing the Qualifying Percentages relevant to each activity.

62. In practice, the FIT Contract requires a substantial amount of component manufacturing work for wind turbines to be conducted in Ontario, which was its clear purpose. Ontario has estimated that the FIT program has created almost 2,000 direct manufacturing jobs.[34]

63. The GEIA PPAs have the same rules. Section 9.2 of the GEIA states that "The Korean Consortium recognizes and acknowledges that among various commitments and obligations of the FIT Contract, the Korean Consortium or the Project Company shall be required to achieve Domestic Content requirements as required by the FIT Rules."[35] There is no significant difference between GEIA and FIT contracts from the Domestic Content perspective

3. Payment and settlement

[33] FIT Contract Version 1.5, at Exhibit D ***(Investor's Schedule of Exhibits at C-0263)***
[34] Ontario Power Authority, "Ontario's Feed-In Tariff Program: Two-Year Review Report", March 19, 2012 at p, 6. ***(Investor's Schedule of Exhibits at C-0609)***
[35] Green Energy Investment Agreement, January 21, 2010, at Section 9.2 ***(Investor's Schedule of Exhibits at C-0322)***

64. Another important feature of PPAs is the provisions for payment and settlement. In basic structure, the Contract Payment is calculated as the Indexed Contract Price times the amount of energy delivered in the hour, minus the same quantity times the greater of the Hourly Ontario Electricity Price ("HOEP") and zero.

65. In practical terms, assuming that HOEP is greater than zero, the wind generator receives the full Indexed Contract Price. It receives the HOEP through the normal IESO settlements system, plus the "top up" from the OPA through the PPA to get to the full Indexed Contract Price.

66. Two features are noteworthy here. First, and foremost, the base payment to wind projects under FIT and GEIA are the same, and are calculated in the same manner.

67. The fundamental payment terms and structures of the GEIA and FIT PPAs are also the same.

68. Second, it is noteworthy under this structure that the OPA never receives or takes title to the electricity generated, which is sold directly into the IESO Grid, and is paid for by the IESO under its normal settlements process. The PPA Contract Payments act only as a top up for power generated, and are collected from ratepayers in Ontario under the Global Adjustment mechanism, which adds a (substantial) charge to customers' bills. The OPA is simply a payment conduit, receiving ratepayer funds and passing them on to FIT suppliers through the PPA contract payments.

4. Conclusion on GEIA and FIT PPAs

69. In contractual terms, the GEIA and FIT PPAs are substantially the same. The GEIA explicitly states that the Korean Consortium will use the FIT Contract form, which governs base pricing, term, payments etc. I therefore conclude that Mesa (under the FIT program) and the Korean Consortium were competing to provide the same product under similar or identical contractual terms.

C. The FIT and GEIA wind programs were on the same scale

70. If the GEIA and FIT programs were of vastly different scales, it might be argued that some special treatment was necessary in order to achieve the construction of large amounts of capacity in a short period or to take advantage of economies of scale.

71. As explained by Dr. Hogan in his WTO report for Canada, the relatively small scale of wind and solar facilities leads to few if any economies of scale in renewable generation, in comparison to thermal and hydro plants.[36] In the absence of significant economies of scale, bigger is not necessarily better, in terms of bringing down generation costs.

72. The initial GEIA program for wind generation was large, but spread out over a considerable period of time. The Korean Consortium planned to develop 400 MW of wind generation in the first phase, with another 1600 MW of wind

[36] "Overview of the Electricity System in the province of Ontario", by William W. Hogan ("Hogan Report"), March 28, 2013, at p. 10 ***(Investor's Schedule of Exhibits at C-0320)***

generation over a period extending to December 31, 2016.[37] The Amended and Restated GEIA, later reduced this amount to 400 MW in the first phase, followed by a total target of 600 additional MW of wind generation by December 31, 2016.[38]

73. Meanwhile, the OPA – despite the reduced transmission capacity available to FIT 1 program projects after the special arrangements made for GEIA projects – has executed well over 2000 MW of on-shore wind project contracts in Ontario up to August 2012.[39]

74. While the sums under both the GEIA and FIT programs are large, it is important to remember that individual wind projects are generally much smaller, and that both FIT and GEIA targets are the amalgamation of smaller individual wind farm projects. This is consistent with the observations of Dr. Hogan regarding economies of scale in wind generation, and the realities of siting very large wind projects.

D. FIT and GEIA wind developers were competitors in the market to secure PPAs in Ontario

75. FIT project developers such as Mesa competed with the Korean Consortium to provide the same product (wind energy delivered to the IESO Grid) under the same or essentially identical contractual terms.

[37] Green Energy Investment Agreement, January 21, 2010, at Section 3.2 ***(Investor's Schedule of Exhibits at C-0322)***

[38] The "Amended and Restated GEIA" ("Amended GEIA") between the Korean Consortium and the Government of Ontario dated June 20, 2013, at Section 3.2 ***(Respondent's Schedule of Exhibits at R-133)***,

[39] Ontario Power Authority, FIT Program, Weekly Report, August 7, 2012, ***(Investor's Schedule of Exhibits at C-0538)***

76. Samsung's former head of business development in Ontario, Zohrab Mawani, viewed Mesa as a competitor to Samsung for wind PPAs, and noted that Samsung's guaranteed transmission access under the GEIA gave it a better competitive position than Mesa.[40]

77. In the remainder of this section, I examine other economic indicators that FIT and GEIA entities were in similar competitive circumstances.

1. The Korean Consortium's wind development partner in Ontario viewed FIT participants such as Mesa as major competitors

78. The Korean Consortium teamed with a local partner, Pattern Renewables Holdings Canada, ULC to develop wind projects for inclusion under the GEIA. [redacted], according to Colin Edwards, head of the Canadian office of Pattern Energy and its senior wind project developer in Ontario.[41] Pattern Energy developed several of the projects that formed part of the wind portfolio under GEIA.

79. Pattern Energy had previously developed wind projects that were submitted into the FIT program in late 2009, [redacted].[42]

[40] Declaration of Zohrab Mawani, August 15, 2013, at para. 10 ***(Investor's Schedule of Exhibits at C-0406)***
[41] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 27 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0537)***
[42] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at pp. 35-36 (August 3, 2012) ***(Investor's Schedule of Exhibits at Tab C-0537)***

[redacted][43]

80. In his deposition, Mr. Edwards specifically identified Mesa – along with several other companies – as the major competitors of Pattern Energy and the Korean Consortium for wind PPAs in Ontario.[44] He characterized the competition to get PPAs as intense, with four to five times as many applications as there were FIT contracts.

2. FIT wind projects were moved into the GEIA by Pattern and the Korean Consortium

81. Further confirmation of the identical nature of FIT and GEIA wind farm projects was provided by the actions of Pattern Energy with respect to wind projects it has already developed. Pattern Energy had submitted ten projects into the FIT program prior to the GEIA, but had received a FIT contract for only one project, called Merlin.[45] Merlin received a FIT Contract during the first round of FIT awards, in February 2010.[46]

[43] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at pp. 35-36 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0537)***

[44] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 65 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-410)***

[45] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at pp. 48-49 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0216)***

[46] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 52 (August 3, 2012) ***(Investor's Schedule of Exhibits at Tab C-0537)***

82. After the signing of the GEIA, Pattern Energy elected to withdraw Merlin from the FIT Contract, so it could be included in the South Kent project as part of the initial phase of GEIA projects.[47]

83. Other FIT projects that were developed by Pattern Energy for the FIT program – but were not successful – were also included later in the GEIA contracts. These had remained in the transmission queue as they had not been awarded a FIT Contract in that competitive process.[48]According to Mr. Edwards, five of the remaining nine projects have been transferred into the GEIA-contracted South Kent project. These are Kent Centre, Harwich, Norton Line and Walker Marsh. This project started construction in April 2013, according to Samsung.[49]

84. The change in fortunes of Patten Energy is rather striking. Under the FIT program, only one of its small projects had received a FIT Contract – the Merlin project. After entering into the joint venture with the Korean Consortium under GEIA, six of the ten projects were successful (Merlin plus the other five projects). The relative attractiveness of GEIA payments and circumstances is also noteworthy – Pattern Energy withdrew its only successful FIT project and converted it to GEIA.

[47] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 52 (August 3, 2012) ***(Investor's Schedule of Exhibits at Tab C-0537)***

[48] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at pp. 48-49 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0216)***

[49] Samsung Website, Samsung Press Release, "Samsung and Pattern announce the start of construction of South Kent Wind, Creating jobs and investment in Ontario", April 30, 2013, ***(Investor's Schedule of Exhibits at C-0539)***

3. Samsung and Pattern Energy acquired other FIT wind projects to incorporate into their GEIA portfolio

85. Further confirmation of the identical nature of FIT and GEIA projects can be seen from the market behavior of Samsung and Pattern Energy with respect to third party wind farm projects.

86. According to Bloomberg, in September 2012 Pattern Energy and Samsung C&T jointly acquired the 180 MW Armow project in Ontario from Acciona SA, a large Spanish wind developer.[50] This project was under development as a FIT project in southern Ontario, but was not ranked highly.[51] In June 2011, the Armow project was ranked 24th in the Bruce region by OPA under the FIT process, well behind the Mesa Arran and TTD projects.[52] After its acquisition by Samsung and Pattern Energy, the Armow project was included under the Korean Consortium's GEIA portfolio.[53]

4. The Korean Consortium and Pattern Energy discussed the acquisition of Mesa FIT wind projects to incorporate into their GEIA portfolio

87. In 2011, after the public announcement of the GEIA, Pattern Energy and the Korean Consortium sought to acquire one or more projects from Mesa in the Bruce region.[54] These discussions did not lead to a sale, but Pattern Energy

[50] Bloomberg News, "Pattern Energy, Samsung acquire Acciona wind farm in Ontario", September 12, 2011, ***(Investor's Schedule of Exhibits at C-0540)***

[51] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 149 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0574)***

[52] Ontario Power Authority, Priority ranking for First Round FIT Contracts, December 21, 2010 ***(Investor's Schedule of Exhibits at C-0073)***

[53] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 149 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0574)***

[54] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 140-145 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0574)***

intended that these projects would be incorporated into the GEIA portfolio - with its preferential transmission access. Pattern Energy discussed with potential FIT project sellers the advantages of GEIA over FIT and Mr. Edwards in his deposition stated that it was "almost self-evident" that competitors would realize this.[55]

E. Conclusions on FIT versus GEIA competition for wind PPAs in Ontario

88. FIT project developers such as Mesa were clearly in competition with the Korean Consortium and its project development partner in Ontario (Pattern Energy) for wind PPAs. This was confirmed by Mr. Edwards of Pattern Energy directly. I have also demonstrated that:

a. All wind energy (FIT or GEIA) is an indistinguishable product, produced using similar or identical technologies

b. The contractual terms for FIT and GEIA PPAs were of substantially the same form, with respect to important base pricing, terms, settlement and other provisions.

c. FIT and GEIA wind projects were interchangeable. In fact, a successful FIT project was withdrawn by Pattern and converted into a GEIA project, while four other unsuccessful FIT projects were included in another GEIA project.

[55] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 140-145 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0574)***

d. The Korean Consortium and Pattern Energy also acquired FIT projects from other developers (e.g. Acciona) and received GEIA contracts for their output. The Korean Consortium and Pattern Energy also discussed acquiring one or more Mesa FIT projects for inclusion in their GEIA portfolio.

89. Based on these facts, I conclude that there is no practical difference between FIT program participants and GEIA participants (the Korean Consortium and its development partner Pattern Energy) in terms of the fundamental circumstances of their competition for wind PPAs in Ontario.

IV. The Korean Consortium Under GEIA was accorded preferential treatment over Mesa and other FIT participants

90. The FIT program offered attractive prices to wind developers.[56] The OPA, as might be expected, therefore saw a substantial response in the amount of capacity offered under the FIT program. As of August 2012, applications for over 21,000 MW of new renewable capacity had been made under the FIT program.[57]

91. While this response was notable it is also posed significant risks for FIT project developers. The FIT program provided a fixed price to developers, so the competition was not to provide an attractive price, but rather to secure transmission capacity for sited projects. Since the amount of transmission capacity was limited, the number of projects that could receive a FIT contract in any electrical region was limited. With so many applicants, competition was intense, as was noted by Mr. Edwards.[58]

A. Preferential Transmission Access under GEIA

92. It is undisputed that the GEIA provided preferential transmission access to the Korean Consortium over FIT participants.[59] Under Phase I of the GEIA, for example, 240 MW of transmission capacity allocated under the FIT Rules in

[56] 2011 Auditor General's Report, Chapter 3 – Electricity Sector – Renewable Energy Initiatives, at p. 106 ***(Investor's Schedule of Exhibits at C-0228)***

[57] Ontario Power Authority, FIT Program, Weekly Report, August 7, 2012, ***(Investor's Schedule of Exhibits at C-0538)***

[58] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 64. (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0537)***

[59] Canada's Counter Memorial, at page 142.

Haldimand County and 260 MW of transmission capacity in Essex County, Chatham-Kent County and the town of Lake Shore was explicitly guaranteed to the Korean Consortium project companies.[60] Under Phases 2 to 5 of the GEIA, additional priority access to the bulk transmission system was provided to the Korean Consortium.

93. Note that under GEIA Section 7.4 the Government of Ontario's undertaking to provide priority transmission access for Phase 2 to 5 is conditioned on at least one Manufacturing Partner commencing manufacturing operations. In Section II, I argued that such a commitment imposed no substantial economic or financial burden on the Korean Consortium over what FIT participants faced. However, it should also be noted that the priority access accorded for 500 MW in Phase I of the GEIA is not conditioned on any Manufacturing performance, even by a Partner. The first 500 MW of valuable transmission capacity was awarded in exchange for no manufacturing and no jobs.[61]

94. Mr. Edwards of Pattern Energy confirmed that priority transmission access was a primary advantage of the GEIA over FIT.[62]

[60] Green Energy Investment Agreement, January 21, 2010, at Section 7.3(b) ***(Investor's Schedule of Exhibits at C-0322)***

[61] Green Energy Investment Agreement, January 21, 2010, at Sections 7.3 and 7.4 ***(Investor's Schedule of Exhibits at C-0322)***

[62] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 176 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0537)***

B. Better pricing under GEIA

95. It is also undisputed that PPAs under the GEIA offered better pricing. The Economic Development Adder appears in the GEIA but not in the FIT Contract. This was originally 0.5 cents/kWh for wind in the original GEIA, but cut to 0.27 cents/kWh in the Amended and Restated GEIA.[63]

96. These adders were expected to add up to substantial sums. The Ontario Ministry of Energy estimated the "total cost" of the Economic Development Adder over the life of the contracts to be $437 million (net present value). The total Economic Development Adder for Phase I and 2 was later capped at $110 million in the Amended and Restated GEIA – still a very substantial sum.

C. Access to governmental resources to surmount regulatory and siting hurdles

97. Under both the GEIA and the FIT programs wind developers faced numerous (but identical) regulatory issues associated with siting, transmission interconnections, environmental restrictions, and other matters.

98. Under the GEIA however the Korean Consortium had substantial assistance promised by the Government of Ontario, which committed to facilitating the necessary regulatory approvals for the GEIA projects. The Government also committed to use its best efforts to require that Hydro One and the IESO to

[63] Green Energy Investment Agreement, January 21, 2010, at Section 9.3 ***(Investor's Schedule of Exhibits at C-0322)***; The "Amended and Restated GEIA" ("Amended and Restated GEIA") between the Korean Consortium and the Government of Ontario dated June 20, 2013 ***(Respondent's Schedule of Exhibits R-133)***.

deliver needed assessments in a timely manner, as well as to liaise with the Ministry of Environment for renewable energy approvals.

99. The Government and the Korean Consortium established a Working Group, with a co-chair from the Government and the Korean Consortium. This Working Group was designed to liaise with key government agencies, recommend sites for the projects, assist and facilitate in the securing transmission rights of way, negotiate Aboriginal consultation protocols, and provide other services.[64]

100. In respect to the Phase I projects, the Government offered access to Government lands under long-term leases (with extensions) at standard government terms and conditions, and agreed to facilitate the securing of rights of way, and other services with respect to siting.[65]

D. Flexibility in adjusting Target Generation Capacity

101. The GEIA provided the Korean Consortium with 2500 MW of reserved transmission capacity, a significant amount. The reserved transmission capacity was of substantial economic benefit to the Korean Consortium. Not only did the GEIA provide a large aggregate amount of transmission capacity to the Korean Consortium, it also offered substantial flexibility in the use of such capacity that was not available to ordinary FIT Applicants.

[64] Green Energy Investment Agreement, January 21, 2010, at Section 5.2 ***(Investor's Schedule of Exhibits at C-0322)***

[65] Green Energy Investment Agreement, January 21, 2010, at Section 5.2 ***(Investor's Schedule of Exhibits at C-0322)***

102. Under Article 3.4 of the GEIA, the Korean Consortium is able to adjust its Targeted Generation Capacity by plus or minus 10% upon reasonable notice. Subject to agreement between the OPA and the Korean Consortium, a modification of a project capacity by a range of plus or minus 20% could be agreed.

103. The ability to invoke the 10% flexibility in project capacity was a unilateral right provided solely to the Korean Consortium, requiring no agreement from the OPA or the Government of Ontario. By comparison, FIT applicants could make no modifications to the nameplate capacity of their projects after the applications were submitted.

104. Such flexibility, which was not offered to FIT program participants, may be of substantial financial value. For example, it may be that given land leases and interconnection details that an additional 10% of additional wind turbine capacity could be added to a project at a lower than average cost. The flexibility offered in GEIA Section 3.4 would then be of substantial financial benefit.

E. Conclusions on GEIA versus FIT Treatment

105. It is undisputed that the GEIA provided a superior treatment to the Korean Consortium than was provided to FIT wind developers. Transmission access was critical to success and as Canada acknowledges a clear discrimination was made in favor of GEIA suppliers over FIT suppliers in this context. It is

also unquestionable that the Korean Consortium received higher prices for wind energy under the GEIA through the Economic Development Adder.

106. There were also other important distinctions, however, that had the effect of reducing risk in GEIA projects over FIT projects. This included the Government of Ontario's convening of a special Working Group to address siting, land and right of way concerns, undertakings to facilitate environmental approvals, and Aboriginal consultations

107. Finally, while the GEIA contract was clearly based on the FIT Contract, changes were made that benefited the Korean Consortium over FIT rivals. This included the flexibility to vary target capacity.

108. Mr. Edwards of Pattern Energy in his deposition summarized the relative treatment under GEIA versus FIT succinctly: "the fact that we signed a joint venture agreement and elected to participate with Samsung is evidence that we thought this was a better opportunity".[66]

[66] Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at pp. 193-194 (August 3, 2012) ***(Investor's Schedule of Exhibits at C-0537)***

V. The GEIA Reduced Many Wind Project Development Risks for the Korean Consortium

109. Wind project developers under FIT faced a set of risks in securing PPAs and getting their projects built in Ontario. Absent the GEIA, the Korean Consortium would have faced these same risks in building wind projects. The special treatment under the GEIA, however, greatly reduced these project completion risks for the Korean Consortium, in comparison to FIT Applicants. This occurred across multiple dimensions.

110. The availability of transmission capacity was a major constraining factor for FIT Applicants; the Korean Consortium under GEIA had guaranteed transmission capacity.

111. FIT Applicants faced numerous regulatory hurdles to get projects sited, with respect to environmental constraints, aboriginal community participation and land access. The Korean Consortium faced the same hurdles, but under the GEIA the Ontario Government facilitated the resolution of each of these problems for the Korean Consortium with a high-level Working Group.[67]

112. Absent the GEIA, the Korean Consortium and its development partner Pattern Energy would have faced the same development risks as Mesa and other FIT Applicants. The operation of the GEIA was to transfer these risks away from the Korean Consortium to its benefit.

[67] In Section 15.7 of both the PPAs signed under the GEIA and the FIT Contract, an aboriginal price adder was available to the proponent. FIT Contract Version 1.5, at Section 15.7 ***(Investor's Schedule of Exhibits at C-0263)***; K2 Wind Project Power Purchase Agreement between Ontario Power Authority and K2 Wind Ontario Limited Partnership, August 2, 2011 ***(Investor's Schedule of Exhibits at C-0287)***

VI. Environmental Attributes

113. I understand that an issue in the current dispute is whether the FIT and GEIA programs involve the procurement of electricity.

114. As I discussed in Section III.B.3 previously, under the FIT and GEIA, the OPA neither receives the electricity under the PPA (which flows into the IESO Grid) nor takes title to the electricity. The OPA does not buy the electricity under the GEIA and FIT PPAs. The OPA merely acts a conduit of payments between ratepayers (through Global Adjustment payments) and wind generators.

115. Under the FIT and GEIA PPAs, all Environmental Attributes are transferred to the OPA.[68] In wind PPAs, such environmental attributes typically include renewable energy credits ("RECs") but could also include carbon offsets. In jurisdictions where comprehensive trading systems exist to meet environmental obligations, the RECs and/or offsets are typically registered and can then be traded among parties like shares, either on exchanges or on an over-the-counter basis.

116. Canada has claimed that the provision in the FIT contract in which the OPA receives Environmental Attributes supports its conclusion that the FIT program constitutes purchase of electricity by the OPA.[69]

[68] FIT Contract Version 1.5, at Section 2.10(a) ***(Investor's Schedule of Exhibits at C-0263)***
[69] Canada's Counter-Memorial at para. 319.

117. The circumstances at that time in Ontario and the GEIA do not support this broad claim. First and foremost, there was no renewable portfolio standard in Ontario in this period so the Environmental Attributes could not include RECs which are typically the chief product (other than electricity) under wind PPAs. The FIT program itself - which paid substantially higher than "brown power" costs for power in order to have wind projects built - alleviated any need for RECs in Ontario. At the time of the FIT and GEIA programs Ontario was not part of any binding carbon offset program either. If the OPA was buying Environmental Attributes under the FIT program these were largely undefined, and it was buying them for no specific and clearly identified regulatory requirement or purpose. Indeed, it was after the GEIA was signed that Minister of Energy instructed the OPA to develop a pilot system to track, audit and sell any Environmental Attributes acquired.[70]

118. Second, to my knowledge the Government of Ontario had no need of environmental attributes (such as RECs or carbon offsets) in this period and if it did acquire such attributes it could only be for the purpose of resale.[71]

119. Third, the text of the GEIA suggests that for any carbon offsets generated from the GEIA projects that these would not fall into a simple model of procurement by the OPA of offsets sold by the Korean Consortium. Section 9.5 of the GEIA states: "The Parties agree to discuss the treatment and

[70] Ontario Power Authority website, Directives to OPA from Minister of Energy, February 3, 2011 – Environmental Attributes, ***(Investor's Schedule of Exhibits at C-0610)***

[71] Letter from Minister Duguid to Colin Andersen (OPA), February 3, 2011, ***(Investor's Schedule of Exhibits at Tab C-0611)***

sharing of any carbon credits generated from the Project in the context of ongoing development of carbon trading systems and such discussions shall occur within the context of the North American cap and trade system currently under development."[72] Similar language appeared in the MOU which preceded the GEIA.[73]

120. I am unaware of any evidence that registration or transfer of actual environmental attributes has taken place under the FIT Contract or the GEIA. I therefore believe it is not accurate to describe the transfer of the potential Environmental Attributes as a sale nor does it appear that the OPA has actually received possession of anything of substantive value with respect to the Environmental Attributes.

[72] Green Energy Investment Agreement, January 21, 2010, at Section 9.5 ***(Investor's Schedule of Exhibits at C-0322)***

[73] Memorandum of Understanding by and Among The Ministry of Energy and Infrastructure and Korea Electric Power Corporation and Samsung C&T Corporation, Section 2.5, December 12, 2008. ***(Investor's Schedule of Exhibits at C-0536)***

VII. Information on Transmission Availability and Timing of Rule Changes Under the FIT Program

121. A feed-in tariff program, such as the FIT and GEIA programs in Ontario, does not rely on competition by price, since by design the price is fixed. Instead, the nature of competition is to qualify for *quantities* of contracts, if, as in Ontario, the price is attractive. A primary form of competition in Ontario was the competition for transmission capacity. A FIT contract could not be awarded where insufficient transmission capacity was available unless a generator was willing to pay for transmission upgrade costs.

122. The basic structure of the FIT program evaluation has been described elsewhere and I will not repeat it here. In this brief section I will focus on the quality and effectiveness of information disclosure to market participants and the sudden changes to FIT program rules and how these may have distorted FIT program efficiency and fairness.

A. Transmission availability data

123. Where quantities of transmission capacity available at specific locations are critical, it is obvious that all competitors should have equal access to information that affects competitive standing, and that this data should be of sufficient quality to support effective decision-making on connection points. Under the FIT program, information on transmission availability was provided to competitors under the Transmission Availability Table ("TAT") data published periodically.

124. From the descriptions provided with the TAT tables it would appear that this is the available transmission capacity on a circuit, and that a project with a larger capacity could logically not be connected. For example, consider the TAT circuit table published on June 3rd, 2011.[74] For the L7S circuit in the Bruce region, for example, the circuit transmission availability was shown as 30 megawatts (MW).

125. In fact, however, a project with substantially larger capacity than 30 MW (the 102 MW Goshen project) was in fact able to connect at this point.[75] Either something changed electrically, or the 30 MW data presented in the TAT table was not a realistic maximum available capacity value at all. The TAT table document states that the information published is the "best available at the time...." in its disclaimer but the discrepancy between stated available circuit capacity and the allowed Goshen connection capacity was quite large.

126. In his Witness Statement Mr. Bob Chow of the OPA stated that the TAT test was applied at the transmission circuit, transformer station and area level.[76] He also notes that this published TAT capacity was in fact “the lowest available capacity at each circuit.”[77]

[74] Ontario Power Authority, FIT Program, Transmission Availability Table, June 3, 2011, at p. 1 ***(Investor's Schedule of Exhibits at C-0166)***
[75] Ontario Power Authority, "FIT Contract Offers for the Bruce-Milton Capacity Allocation Process", July 4, 2011 ***(Investor's Schedule of Exhibits at C-0292)***
[76] RWS - Chow, at p. 8. ***[Confidential - CAN]***,
[77] RWS - Chow, at p. 14. **[Confidential - CAN]**

127. This appears inconsistent with the labeling of capacities on the TAT tables themselves, which refer to “Circuit Availability (MW)” and never to minimum circuit availability.[78]

128. If the published TAT tables provided no meaningful information on the amount of maximum capacity available it is hard to see how a connection quantity-based form of competition like the FIT Program in Ontario could achieve efficient and equitable results.

129. The TAT tables were to provide all FIT Applicants with transmission availability information on a fair and transparent basis. I cannot see any evidence to suggest that the clear wording on the TAT tables should not have been followed which refer only to available capacity, and not minimum available capacity. If in fact all of these values did imply minimum available transmission capacity it does not seem that this modification or distinction was clearly conveyed to all FIT Applicants who were relying on the TAT Tables to complete their FIT applications.

B. Sudden changes in FIT program rules and changes in connection points in June 2011

130. For a competitive process to operate efficiently and fairly, participants need to have a clear understanding of the rules and time and information to act effectively. The sudden changes to the FIT rules in June 2011 are therefore quite surprising.

[78] Ontario Power Authority, FIT Program, Transmission Availability Table, June 3, 2011, at p. 1 ***(Investor's Schedule of Exhibits at C-0166)***

131. On June 3 2011 the OPA - at the direction of the Minister of Energy and with the encouragement of the Premier's Office[79] - announced a "window" for changing connection points in the Bruce and West of London regions that would last for five days, from June 6-10th.[80] I understand that the reasonableness of this decision is a matter of dispute between the parties.[81]

132. Canada states that FIT Applicants were aware of the possibility of a change in connection points, and that a short window of five days was chosen to avoid further delays.[82] Canada also states that the majority of Canadian Wind Energy Association members supported a short length window for connection point changes and that FIT Applicants were aware of the development of the Bruce to Milton line.[83]

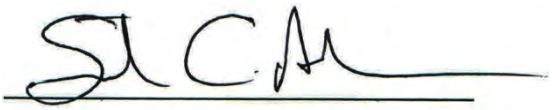
133. The very short notice for making interconnection points changes – an announcement on Friday for a change window in the following week – seems to me rather extraordinary. Typically utility competitive processes to secure supply contracts (such as Request for Proposal mechanisms) in my experience err on the side of caution, and allow enough time to ensure that all bidders can reasonably evaluate the full information provided. These decisions often must be backed by substantial technical analysis.

[79] RWS – Lo, at para. 50 **[Confidential - CAN]**
[80] Canada's Counter-Memorial at para. 199.
[81] I note that June 3rd, 2011 was a Friday and that the connection point change window opened on the Monday. So the window effectively opened with notice of one business day.
[82] Canada's Counter-Memorial at para. 200.
[83] Canada's Counter-Memorial at para. 201.

134. I do not understand how all affected bidders could be expected to make reasoned decisions on transmission interconnections on this time frame, especially since these decisions could have major competitive and economic implications for them under the FIT Rules and any future Economic Connection Te st.[84]

135. The imposition of such an important rule change on such short notice – a single weekend – undermines the perceived integrity of the FIT process.

Dated: April 27, 2014



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[84] At Section 5.4(a) of the FIT Rules, the Economic Connection Test was to be run for each region of the province at least every six months. Ontario Power Authority, FIT Rules Version 1.5, Section 5.4(a), June 3, 2011 ***(Investor's Schedule of Exhibits at C-0005)***

Appendix A – Index of Exhibits

Exhibit No.	Date	Document Title	Designation
C-0322	January 21, 2010	Green Energy Investment Agreement	
R-076	January 21, 2010	Ministry of Energy Archived Backgrounder, "Ontario Delivers $7 Billion Green Investment"	
C-0536	December 12, 2008	Memorandum of Understanding by and Among The Ministry of Energy and Infrastructure and Korea Electric Power Corporation and Samsung C&T Corporation	
C-0328	[redacted]	[redacted]	Restricted Access
C-0537	August 3, 2012	Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*	Confidential
R-133	June 20, 2013	The "Amended and Restated GEIA" between the Korean Consortium and the Government of Ontario	
C-0005	June 3, 2011	Ontario Power Authority, FIT Rules Version 1.5	
C-0593	June 26, 2013	Samsung Website, "Samsung Renewable Energy signs manufacturing partnership agreement with Canadian Solar Inc.",	
C-0594	December 2, 2010	Siemens Wesbite, "Siemens selects Tillsonburg, Ontario, as new home for Canadian wind turbine blade manufacturing facility"	
C-0595	October 2	Canadian Solar Press Release, "Canadian Solar and Satcon Launch First Strategic Partnership Meeting Ontario's Feed-in-Tariff Domestic Content Requirements"	
C-0596	December 3	Canadian Solar Press Release, "Canadian Solar Announces Intention to Build Solar Panel Manufacturing Facility in Ontario"	
C-0597	April 13, 2010	Canadian Solar Press Release, "Canadian Solar Awarded Contract Offers for 176 MW (AC) of Distributed Solar Power Projects by Ontario Power Authority via Feed-in-Tariff Program"	
C-0598	December 17, 2012	Sally Bakewell, Bloomberg News, "Suzlon's Repower Unit Wins 105-Megawatt Turbine Order in Canada"	
C-0599	May 1, 2013	Wind Power Monthly Website, "Repower announces Ontario factory location"	
C-0600	October 16, 2012	Wind Power Monthly Website, "GE extends wind turbine manufacturing in Ontario"	
C-0320	March 28, 2013	"Overview of the Electricity System in the province of Ontario", by William W. Hogan ("Hogan Report")	
C-0263	June 3, 2011	FIT Contract Version 1.5	
C-0609	March 19, 2012	Ontario Power Authority, "Ontario's Feed-In Tariff Program: Two-Year Review Report"	
C-0538	August 7, 2012	Ontario Power Authority, FIT Program, Weekly Report	

Exhibit No.	Date	Document Title	Designation
C-0406	August 15, 2013	Declaration of Zohrab Mawani	
C-410	August 3, 2012	Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at pp. 35-36	Confidential
C-0216	August 3, 2012	Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC*, at p. 65	Confidential
C-0539	April 20, 2013	Samsung Website, Samsung Press Release, "Samsung and Pattern announce the start of construction of South Kent Wind, Creating jobs and investment in Ontario"	
C-0540	September 12, 2011	Bloomberg News, "Pattern Energy, Samsung acquire Acciona wind farm in Ontario"	
C-0574	August 3, 2012	Transcript of Colin Edwards Deposition In *Re Application of Mesa Power Group, LLC,* at p. 149	Restricted Access
C-0073	December 21, 2010	Ontario Power Authority, Priority ranking for First Round FIT Contracts, December 21, 2010	
C-0228		2011 Auditor General's Report, Chapter 3 – Electricity Sector – Renewable Energy Initiatives	
	February 28, 2014	Counter Memorial of Canada	
C-0287	[redacted]	[redacted]	Restricted Access
C-0610	February 3, 2011	Ontario Power Authority website, Directives to OPA from Minister of Energy, February 3, 2011 – Environmental Attributes	
C-0611	February 3, 2011	Letter from Minister Duguid to Colin Andersen (OPA)	
C-0166	June 3, 2011	Ontario Power Authority, FIT Program, Transmission Availability Table	
C-0292	July 4, 2011	Ontario Power Authority, "FIT Contract Offers for the Bruce-Milton Capacity Allocation Process"	
	February 28, 2014	Witness Statement of Bob Chow	Confidential
	February 28, 2014	Witness Statement of Susan Lo	Confidential

Appendix B – Curriculum Vitae

CRA Charles River Associates

SEABRON C. ADAMSON

Senior Consultant

M.S. Technology and Policy (Energy)
Massachusetts Institute of Technology

M.S. in Applied Physics
Georgia Institute of Technology

B.S. in Physics (High Honors)
Georgia Institute of Technology

M.A. in Economics
Boston University

SUMMARY

Seabron Adamson is a Senior Consultant to Charles River Associates. He was formerly a Vice President of CRA and co-Head of the firm's Energy and Environment practice from 2006 to 2008..

Seabron's professional focus is the economics and analysis of energy markets, especially for power and natural gas, and with a focus on trading, investment valuation, market design and due diligence. He has conducted market analysis for major energy projects in the United States, Canada, the United Kingdom, Europe, Latin America and Asia. He has extensive experience in the US renewables and cogeneration sector – especially with respect to contract and transmission integration matters.

In addition to his consulting work with CRA, Seabron is an adjunct lecturer at the A.B. Freeman School of Business of Tulane University and a research associate of the Tulane Energy Institute. He has taught energy portfolio management at Tulane at the graduate level. His research has been published in *Energy Economics*, *Energy Policy* and other journals. His work on financial transmission rights markets in electricity markets was recently published in a new book published by Springer.

Seabron also has extensive experience as an economic and policy adviser on the power sector in the US and internationally. He has worked on market and transmission restructuring issues in New England, New York, Ontario, PJM, ERCOT, California and MISO He has acted as an expert adviser to the Government of Alberta.

Seabron has testified extensively as an expert witness in a range of power sector issues. This has included extensive testimony on market design, transmission pricing and other issues at FERC and in energy sector contract litigation.

From 2008 to 2010 Seabron was a lead North American gas and power analyst for a major alternative investment firm. In this role, he led North American energy analytics as part of a small team managing a major energy commodities portfolio. Prior to joining CRA, he was a Director of Tabors Caramanis & Associates. Seabron was a co-founder of the Frontier Economics Group, an international economics consulting group with offices in London, Melbourne and Cambridge, MA. He previously founded the U.S. practice of London Economics and managed the American office until the company's sale in 1999. He was a consultant with London Economics, based in the U.K. from 1992 to 1996.

EXPERIENCE HIGHLIGHTS

Present	Senior Consultant to Charles River Associates, Boston, MA
2008 - 2010	Senior Gas and Power Analyst, Tudor Investment Corporation, Boston, MA/Greenwich, CT. Lead North American energy analysts for commodities team within a major US alternative investment firm. Led analytics team for trading and investments in US natural gas and power. Also supported analysis of private equity investments in European electricity generation.
2004 - 2008	Vice President (and Co-Head, Energy and Environment Practice), Charles River Associates, Boston, MA. Led a wide range of major consulting projects in the energy sector, especially focusing on investment valuation, due diligence and market analysis. Co-Head of the E&E practice from 2006-2008, and managed Enterprise and Asset Investment team of ~20 professionals within the practice.
2003 - 2004	Director, Tabors Caramanis & Associates. Managed projects on economic analysis of energy markets and energy sector asset valuations.
1999 - 2003	Founder and President, Frontier Economics Inc. Co-founder of Frontier Economics Group, an international economics consulting firm with offices in Cambridge, MA, London, UK and Melbourne, Australia. Managed major client assignments regarding litigation and energy market analysis. Provided extensive expert testimony on market competition issues, market design, and regulatory economics.
1996 -1999	President, London Economics Inc. Started US subsidiary of major European economics consulting firm. Advised major energy sector clients on market development, restructuring, retail competition, and mergers and acquisitions. Advised clients on significant M&A transactions.
1992 – 1996	Consultant, Senior Consultant and Managing Consultant, London Economics Ltd. (UK). Provided economic and strategic advice to major UK and international energy clients operating in the natural gas and electricity markets.
1990 – 1992	Research Assistant, Massachusetts Institute of Technology. Research on carbon reduction strategies for the US power industry sponsored by U.S. EPA and EPRI.
1988 –1990	Research engineer, Itek Optical Systems. Developed and implemented interferometry techniques for fabrication of the primary of the Keck 10-meter telescope, the world's largest optical telescope.

SELECT CONSULTING/PROFESSIONAL EXPERIENCE

Generation sector (thermal and renewables)

- Advice on transmission issues associated with a wind farm in the Midwest ISO region.
- Lead appraiser for valuing stakes in three major nuclear units in the United States (PJM and MISO).
- Support to IESO on modeling surplus baseload generation from the wind power and nuclear sector in the Ontario electricity market and economic impacts of proposed rules changes before the Ontario Energy Board
- Analysis of wind farm PPAs for a utility purchaser.
- Led CRA project team (Mexico and European assets) assisting an Asian sovereign wealth fund and utility in bidding in an auction for a 50% stake in InterGen, consisting of generating assets in the UK, Netherlands, and Mexico. Led team modeling CFE contracts for valuation of Mexican assets and advised on fuel and regulatory risks. Also the CRA team was responsible for building the PPA financial models for InterGen's UK and Dutch assets.
- Advisor to an infrastructure fund (part of a major global investment bank) analyze a potential investment in a combined cycle project in Ontario, Canada.
- Built detailed financial models for the contracted assets of a major US generator, used in valuing the business. This included extensive modeling of complex cogen contracts.
- Adviser to a major US wind power developer on offtake contract development and national strategy for locating new projects in RPS-oriented markets.
- Valued 4 thermal plants in the Southeast US to be acquired by the private equity arm of a major US investment bank.
- Developed a detailed model of operations for a large 500 MW cogen plant in Canada, which involved extensive modeling of plant operations under different operating regimes involving combinations of gas and steam turbines, HRSGs, etc.
- Led CRA project team in helping a Fortune 500 generation firm develop its generation expansion strategy, reporting directly to the CEO and board of directors. Analyzed markets, synergies with current businesses and scope for diversification.
- Valuation associated with divestiture of the 775 MW Dam Head Creek CCGT plant owned by Entergy in the United Kingdom.
- Valuation of major power plant contracts in the Alberta (Canada) market as part of a government-mandated auction process.
- Advice to a private equity fund on various thermal sector transactions across the United States.

- Advisor to a UK-based group on the potential acquisition and financing of the Fiddler's Ferry and Ferrybridge thermal power stations in the United Kingdom.
- Advisor to a major UK utility group on UK power market issues.
- Advisor to Scottish Power on transmission charging arrangements in the UK and their potential impact on generation assets (thermal and wind) in Scotland and England.
- Analysis of the economics of a large CCGT/cogen plant in Ontario as part of a dispute.
- Valuation of a portfolio of gas-fired generation assets in the United States for a Fortune 500 utility.
- Advice to European and Asian utility groups seeking to diversify into the North American generation market.
- Work with KKR, Credit Suisse First Boston and Conjunction LLC on development of major HVDC line into New York City
- Advice on generation market investments to a private equity group;
- Lead market advisor to the AES Corporation on the issuance of $600 million in Pass-Through Certificates under Rule 144A, backed by the revenues of four merchant coal-fired plants purchased by AES from NYSEG. The transaction, which was rated by S&P, Moody's and Fitch/IBCA, also included a $120 million lease equity facility
- Market analysis for Bank of America in support of the debt financing of generating assets in New England
- Market and transmission advisor to a private client on purchase of the 4000 MW+ generation business of New England Electric Systems in New England
- Valuation of PG&E thermal assets for bidder .
- Advice to private clients on the acquisition of the generating businesses of Boston Edison Company and Central Maine Power.
- Advice to NationsBank on merchant plant financing in the United States.
- Market analysis and strategic advice on the acquisition and restructuring of Destec Energy, an IPP developer formerly owned by Dow Chemical, including valuation of a large number of cogen facilities.
- Financial modeling in support of a possible acquisition and restructuring of a regulated US utility by an energy company..
- Assessment of market opportunities and target utilities for a private client, in conjunction with client's investment banking team..

- Analysis and modeling of the New England Power Pool, ERCOT, WSPP and other bulk power markets in M&A transactions for various private clients.

Energy litigation and analysis

- Expert in US civil case regarding tax valuation issues for a major generating plant.
- Expert witness in American Arbitration Association proceeding in New York on an energy sales contract.
- Expert testimony (joint with R. Tabors) on gas-electric coordination issues in New England and impacts of proposed rules changes in ISO-NE
- Litigation regarding Energy Sales Agreement (electricity and steam) from major combined-cycle cogeneration facility in Canada;
- Arbitration regarding PPA from power plant in Latin America, before UNICITRAL panel in Geneva;
- ICC arbitration on electric generation technology issue between a Chinese company and a European company
- Extensive testimony for various generation clients on market rules development and changes in various markets including NYISO, ISO New England, PJM etc.
- Expert testimony and report for Pepco Holdings Inc. and subsidiaries on FERC market-based rate authorization
- Analysis of the Pacific Northwest power market and relationship between natural gas and power forwards prices
- Expert witness on behalf of Competitive Supplier Group on detailed methodology to be used in California refund case.
- Leader of team which analyzed the potential for strategic behavior in Alberta's energy market, and developed contractual mechanisms to mitigate market power as part of major study for the Government of Alberta.
- Prepared affidavit on local market power mitigation issues in the New York ISO for Mirant operating entities
- Supply margin assessment of market power for Conectiv Energy Supply Inc. as part of market-based rates triennial review
- Analysis and negotiations with NYISO market monitor regarding bidding of a day-ahead risk premium in the NYISO
- Analysis of market pricing in the NYISO and PJM TCC markets

- Electricity and natural gas retailing and default service
- Strategic advice to Centrica North America on power and natural retailing issues in the United States
- Advice and expert report for Centrica North America on retail market issues in the Commonwealth of Massachusetts
- Advisor and expert witness to ECTR Canada, the Ontario G10 utilities and other parties on standard supply service issues before the Ontario Energy Board

Electricity and natural gas restructuring

- Extensive advice to various clients on Ontario electric restructuring issues, including retail competition issues
- Analysis of market power for market-based rates authorization before FERC of PHI Holdings ;
- Extensive advice to Mirant on the New England and New York market designs
- Advice to a major utility client on assessing financial impact of market rule issues related to joining the PJM Interconnection;
- Advice to a utility client on the design of the Alliance RTO
- Analysis for RTO West on adaptability of PJM rule set to RTO West (2001/02);
- Advisor to Enron Corporation on California market issues and author of White Paper filed with FERC
- Expert witness and advisor for the New England Generators on congestion management, multi-settlement and other market re-design issues regarding ISO New England before the FERC ;
- Expert witness before the Federal Energy Regulatory Commission for Cabrillo Power LLC (Dynegy, Inc.) on reliability must-run contract design
- Preparation of affidavit for filing with FERC by KeySpan on pricing of non-spinning reserve in the New York ISO
- Advisor to Dynegy Inc. on continuing redesign efforts of the California ISO
- Analysis of the restructured New England Power Pool rules and operations as part of major acquisition. Also work on the NEPOOL design for a major US power marketer and subsequently for a major generator
- Advisor to a private client on development of the Alliance ISO
- Advisor on transmission pricing proposals and other aspects of ERCOT ISO design to a major Texas electricity company

- Advice to Pacific Gas and Electric on the design of the California power market, including forwards markets, ancillary services and settlement

- Advisor to Duke Power on restructuring issues;

Natural gas and liquids

- Lead gas analysis for a major investment fund highly active in the North American natural gas sector. Led development of analytical models, and continually updated supply/demand balance forecasts in support of trading activities.

- Built fundamental supply and demand models used in the management of a large gas trading book.

- Analysis of US unconventional shale gas production, and its impact on the future of US gas supply. Detailed analysis and modeling of shale gas economics in several of the major shale plays (Barnett, Marcellus, etc.)

- Analysis of natural gas liquids (NGLs) markets in the United States and its impact on natural gas prices. Analyzed prices of major NGL end products (ethane, propane, natural gasoline, etc.) and production economics for E&P firms.

- Analysis of European and North Atlantic basin LNG markets, including scope for arbitrage of US (Henry Hub) and UK (NBP) natural gas markets.

- Advice to various clients on the UK natural gas markets, especially regarding security of supply issues, long-term natural gas contract valuation, energy efficiency issues and network regulation.

- Analysis of strategy for oil tar production and export potential for PdVSA in Venezuela.

Contract, portfolio and risk analysis

- Advice to major market participant on risk pricing issues associated with plant operations in the NYISO, and provided all economic analysis in successful negotiation of agreement with the NYISO Independent Market Adviser on pricing of such risks

- Analyzed contract portfolio decisions of British distribution utilities using a Markowitz mean-variance approach, on behalf of the British regulator OFFER;

- Analyzed contract portfolio composition for New England market participant (1999);

- Development of contract-based divestiture model for Alberta Department of Energy, forming the basis of the Alberta *Electric Utilities Act Amendments of 1998*.

- Analyzed off-take contract in the Alberta contract auction, on behalf of a bidder (2000);

- Analysis of NEES Standard Offer contract as part of a major acquisition, examining risk and cashflow impacts to bidder (1997);

- Analysis of California RMR contracts for major bidder (1997);
- Analysis of risks in British Gas indexed long-term gas contracts, as part of IPP development decisions (1993-94);

Network regulation (electricity and natural gas)

- Advisor and expert witness to the Ontario G10 utilities, GPU Inc., et al on distribution performance-based ratemaking before the Ontario Energy Board and continuing advice to Ontario clients on distribution regulation (1999-2002).
- Advisor and expert witness to the Attorney General of the Commonwealth of Massachusetts regarding the Joint Petition of Eastern Enterprises and Colonial Gas Company for Approvals of Merger before the Massachusetts Department of Telecommunications and Energy (1999).
- Advisor and expert witness to the Attorney General of the Commonwealth of Massachusetts regarding the Joint Petition of Boston Edison Company and Commonwealth Energy Systems for Approvals of Merger before the Massachusetts Department of Telecommunications and Energy (1999).

FIELDS OF EXPERTISE

- Energy Economics
- Energy Markets Design and Analysis
- Financial Analysis of Energy Sector Mergers and Acquisitions

PROFESSIONAL AFFILIATIONS

- International Association for Energy Economics
- Academic reviewer for *The Energy Journal*, *Energy Policy*, *Ecological Economics* and other journals.

PUBLICATIONS

Articles and Reviews

S. Adamson, T. Noe and G.Parker,. "Efficiency of Financial Transmission Rights Markets in Centrally Coordinated Periodic Auctions" *Energy Economics*. Vol. 32, No. 4.(2010)

S. Adamson, and G. Parker. "Participation and Efficiency in the New York Financial Transmission Rights Markets.", chapter in *Financial Transmission Rights: Analysis, Experiences and Prospects*, J Rossellon and T Kristansen, eds, Springer, 2013.

Seabron Adamson and A.J. Goulding, “The ABCs of Market Power Mitigation: Use of Auctioned Biddable Contracts to Enhance Competition in Generation Markets”, *The Electricity Journal*, December, 1998.

S. Adamson and A. Sagar, “Managing Climate Risks through a Tradable Contingent Securities Approach”, *Energy Policy*, January 2002.

Sabine Schnittger and Seabron Adamson, “Retail Competition in Electricity – Market Prices Revisited”, *The Electricity Journal*, July 2001.

Seabron Adamson, “Industry Structures and Market Mechanisms”, *Public Utilities Fortnightly*, April 1995.

S. Adamson, R. Laslett, R. Bates and A. Pototschnig, Market-Based Control of Air Pollution in Krakow, Poland: Can Economic Incentives Help? World Bank Technical Paper, 1994.

S. Adamson, “Auctioned Biddable Contracts for Mitigation of Electricity Market Power”, presentation at an invited seminar at the Office of Economic Policy, Federal Energy Regulatory Commission, 1998.

Seabron Adamson and Kevin Wellenius, “Determination of Horizontal Market Power Abuse in Wholesale Electricity Markets”, paper presented at the POWER conference, University of California at Berkeley, 2000.

Selected Expert Testimony and Reports

Testimony before the Federal Energy Regulatory Commission regarding gas-electric market interactions in CAISO.

Testimony in an American Arbitration Association proceeding regarding the terms of an energy sales contract

Testimony (joint with R. Tabors) before the Federal Energy Regulatory Commission on gas-electric coordination and proposed rules changes in ISO New England market.

Testimony before an Ontario arbitration tribunal with respect to a major contract dispute for a gas-fired cogeneration plant;

Testimony before the Ontario Energy Board on behalf of London Hydro with respect to recovery of transitional costs in regulated rates.

Written testimony before FERC on market power and market-based rate authorization of PHI Holdings and affiliate companies (2002 and 2005);

Testimony in UNCITRAL arbitration in Geneva regarding an energy sales agreement in Latin America.

Testimony in ICC arbitration regarding generation technology licensing in China.

Testimony of Seabron C. Adamson on behalf of Calpine Corporation before the Federal Energy Regulatory Commission in Southern Power, Docket ER03-713, November 2003.

Joint Reply Comments of Centrica North America and TXU Energy Retail LP before the Department of Telecommunications and Energy, Massachusetts in Docket 02-40.

Prepared Issue 1 Responsive Testimony of Seabron Adamson on behalf of the Competitive Supplier Group (EPMI et. al.) before the FERC, regarding California refund calculation methodology, Dockets No. EL00-095, Nov. 6th, 2001. Also testimony at hearing in March 2002.

Prepared Direct and Rebuttal Testimony for the Transaction Finality Group (EPMI et. al.) in FERC Evidentiary hearings related to the Pacific Northwest power markets (Dockets EL01-10-000 and EL01-10-001), September 2001.

Affidavit of Seabron Adamson on behalf of Indicated New England Generators (Mirant, American National Power, PG&E NEG) in ISO New England, EL00-62-015. June 2001.

Affidavit of Seabron Adamson on behalf of Mirant (MAEM) et. al. in FERC Docket ER01-1385-000 and EL01-45-000 regarding local market mitigation procedures in the New York ISO, April 2001.

White Paper on future California market development prepared by Seabron Adamson and Carl Imparato on behalf of EPMI/EES, filed with FERC under Dockets EL00-95-000 and EL00-98-000 (consolidated), EL00-104-000 (not consolidated), ER00-3673-000 (not consolidated), ER00-3461-000 (not consolidated), EC00-107-000 (not consolidated) November, 2000.

Affidavit of Seabron Adamson on behalf of EPMI and EES in answer to complaint by the California Municipal Utilities Association, Docket No. EL01-1-000, October 2000.

Prepared Direct Testimony of Seabron Adamson on behalf of the New England Generators (PG&E NEG, Mirant, Sithe, et al) before the FERC, regarding market design issues in NEPOOL, Dockets No. ER99-2335-000, April, 2000.

Prepared Rebuttal Testimony of Seabron C. Adamson on behalf of Cabrillo I LLC and Cabrillo II LLC (Dynegy) before the FERC, regarding fixed option payments for reliability must-run units, Dockets ER98-496-006 and ER98-2160-004, March, 2000.

Affidavit of Seabron C. Adamson on behalf of KeySpan regarding pricing on non-spinning reserves in the New York ISO, Docket No. ER00-1969-000, April 2000.

Testimony of Seabron C. Adamson on behalf of Enerconnect, Ontario G10 Utilities et al before the Ontario Energy Board, regarding the Standard Service Supply Code for the Province of Ontario (July 1999).

Testimony of Seabron C. Adamson on behalf of the Ontario G10 Utilities, GPU et al before the Ontario Energy Board, regarding Distribution Performance-Based Ratemaking for the Province of Ontario (September-October 1999). Also oral testimony before the Ontario Energy Board.

Joint Testimony of Seabron Adamson and Raymond Hartman on behalf of the Massachusetts Attorney General before the Massachusetts Department of Telecommunications and Energy, regarding the Joint Petition of Eastern Enterprises and Colonial Gas Company for Approvals of Merger (DTE 98-128).

Joint Testimony of Seabron Adamson and Raymond Hartman on behalf of the Massachusetts Attorney General before the Massachusetts Department of Telecommunications and Energy, regarding the Joint Petition of Boston Edison Company and Commonwealth Energy Systems for Approvals of Merger.

Testimony of Seabron C. Adamson for the California ISO, ER98-12-000, to the Federal Energy Regulatory Commission, October 1997.

Seabron C. Adamson and Sam Lovick, “Summary of Market Power Mitigation Options for the Power Exchange” submitted to the FERC on behalf of PG&E, SCE and SDG&E as part of Dockets EC-96-003 and ER96-1663-003