Alberta Utilities Commission

In the Matter of the Need for the Jenner Wind Energy Connection

And in the matter of the *Electric Utilities Act*, S.A. 2003, c. E-5.1, the *Alberta Utilities Commission Act*, S.A. 2007, c. A-37.2, the *Hydro and Electric Energy Act*, R.S.A. 2000, c. H-16, the Regulations made thereunder, and Alberta Utilities Commission Rule 007

Application of the Alberta Electric System Operator for approval of the Jenner Wind Energy Connection Needs Identification Document

PART A - APPLICATION

1 Introduction

1.1 Application – Pursuant to Section 34(1)(c) of the *Electric Utilities Act* (Act), and in accordance with further provisions set out in legislation,[1] the Alberta Electric System Operator (AESO) applies to the Alberta Utilities Commission (Commission) for approval of the *Jenner Wind Energy Connection Needs Identification Document* (Application).

1.2 Application Overview – Power Renewable Energy Corporation (PRE) has requested system access service for a proposed wind aggregated generating facility named the Jenner Wind Power Project[2] (the Facility). The Facility is to be located northeast of the City of Brooks (AESO Planning Area 48, Empress). The Facility has an expected in-service date of Q4 2017.[3] PRE's request includes a Rate STS, *Supply Transmission Service*, contract capacity of 120 MW and a Rate DTS, *Demand Transmission Service*, contract capacity of 1 MW for new system access service in the area. PRE's request also indicated their intention to submit a proposal to construct and to temporarily operate some transmission facilities, as contemplated in Section 5 of the *Transmission Deficiency Regulation* (TDReg).

PRE's system access service request (SASR) was originally submitted by Joss Wind Power Inc. (Joss Wind). On November 30, 2015, Joss Wind sold the Facility to PRE, and all required assignments of the interconnection rights were completed on February 2, 2016.[4] In this Application, the term "market participant" will be used to refer to Joss Wind, PRE, or both, as appropriate in the context that the term is used.

PRE's request can be met by adding a new 240 kV circuit to connect PRE's proposed Halsbury 306S substation and the existing Jenner 275S substation, and by modifying

[1] The *Alberta Utilities Commission Act*, S.A. 2007, c. A-37.2, the *Hydro and Electric Energy Act*, R.S.A.2000, c. H-16, the Regulations made thereunder, and Alberta Utilities Commission Rule 007.

[2] Proceeding ID No. 21394, Exhibit 21394-X0002.

[3] Proceeding ID No. 21394, Exhibit 21394-X0002, page 6.

[4] Proceeding ID No. 21394, Exhibit 21394-X0002, page 3.

the existing Jenner 275S substation, including adding a 240 kV circuit breaker (as further described in Section 2.2, the "Proposed Transmission Development"). In a separate and subsequent SASR, the market participant has requested a Rate STS contract capacity increase of 180 MW from 120 MW to 300 MW for system access service to be provided at the proposed Halsbury 306S substation (Rate STS Increase Request). However, this Application describes only the need to respond to PRE's initial request for system access service for the Facility, and does not address the Rate STS Increase Request. The Rate STS Increase Request will be addressed in a separate needs identification document, if and when required.

The scheduled in-service date for the Proposed Transmission Development is October 2, 2017.

Having followed the AESO Connection Process,[5] the AESO has determined that the Proposed Transmission Development provides a reasonable opportunity for the market participant to exchange electricity. The Proposed Transmission Development is consistent with the AESO's long-term plans for the South Planning Region, which includes the Proposed Transmission Development area. The AESO, in accordance with its responsibility to respond to requests for system access service, submits this Application to the Commission for approval.[6,7]

1.3 Market Participant Proposal – On March 1, 2014, the market participant confirmed its intention to submit a proposal to the AESO, pursuant to Section 5 of the TDReg, for the construction and temporary operation of the PRE Facilities (Market Participant Proposal), as defined in Section 2.2.

[5] For information purposes, refer to note iv of Part C of this Application for more information on the AESO's Connection Process.

[6] For information purposes, some of the legislative provisions relating to the AESO's planning duties and duty to provide system access service are referenced in notes i and ii of Part C of this Application.

[7] Note v of Part C of this Application describes the Application scope in more detail.

As a consequence of the foregoing, pursuant to Section 35(1)(b) of the Act, the AESO requested a proposal from the market participant, including for the purpose of assisting the AESO in preparing this Application.

The AESO considers a completed Market Participant Proposal to have been submitted by PRE on May 11, 2016. Subsequently, on May 16, 2016, the AESO conditionally approved the Market Participant Proposal pursuant to Section 36 of the Act, and specified the time within which PRE was to submit, for Commission approval under the *Hydro and Electric Energy Act* (HEEA), a transmission facility proposal[8] (Facility Proposal) for the PRE Facilities.

1.4 AESO Directions to AltaLink – During the AESO Connection Process, the AESO issued various directions to AltaLink Management Ltd.[9] (AltaLink), as the legal owner of transmission facilities (TFO), including direction (i) to assist the AESO in preparing this Application, and (ii) to submit, for Commission approval under the HEEA, a Facility Proposal for the TFO Facilities, as defined in Section 2.2.[10]

[8] Also referred to as facility application, or FA, under Commission Rule 007.

[9] In its capacity as general partner of AltaLink, L.P.

[10] The directions are described in more detail in the following sections of this Application and in Part C, note vi.

2 Need Overview and Proposed Transmission Development

2.1 Duty to Provide Transmission System Access Service – The AESO, pursuant to its responsibilities under Section 29 of the Act, must provide system access service on the transmission system in a manner that gives all market participants (in this case, PRE) a reasonable opportunity to exchange electric energy.

PRE has requested system access service on the transmission system, thereby establishing the need for this Application. Through the AESO Connection Process, the AESO, the market participant, and AltaLink have collaborated to determine the characteristics of the Proposed Transmission Development and to assess the impacts that the Proposed Transmission Development and the associated load and generation would have on the transmission system.

2.2 Proposed Transmission Development – The Proposed Transmission Development involves connection the Facility to the transmission system, and consists of:

A. transmission facilities that, as contemplated by Section 5 of the TDReg, will be constructed by PRE, and thereafter jointly operated by PRE and AltaLink for a temporary period of time; and
B. transmission facilities that will be constructed and operated by AltaLink.

A. The PRE Facilities include the following major elements:

1. Add a new 240 kV circuit, designated as 949L, to connect PRE's proposed Halsbury 306S substation and the existing Jenner 275S substation; and
2. Modify, alter, add or remove equipment, including switchgear, and any operational, protection, control and telecommunication devices required to undertake the work as planned and ensure proper integration with the transmission system.

B. The TFO Facilities include the following major elements:

3. Modify the existing Jenner 275S substation, including adding one 240 kV circuit breaker; and

4. Modify, alter, add or remove equipment, including switchgear, and any operational, protection, control and telecommunication devices required to undertake the work as planned and ensure proper integration with the transmission system.[11]

[11] Details and configuration of equipment required for the Proposed Transmission Development, including substation single-line diagrams, are more specifically described in the AESO's Functional Specification included in the TFO's and PRE's Facility Proposals. The new 240 kV circuit is currently estimated to have a length of approximately 15 kilometres. Also, further details will be determined as detailed engineering progresses and the market participant's operating requirements are finalized. Routing and/or siting of transmission facilities do not form part of this Application and are addressed in the TFO's and PRE's Facility Proposals. Line numbering and substation names provided here are for ease of reference and are subject to change as engineering and design progresses. Market participant facilities that may subsequently be connected to the Proposed Transmission Development are the responsibility of the market participant and are not included in the Application.

2.3 Proposed Transmission Development Cost Estimates – PRE and AltaLink have prepared cost estimates for the Proposed Transmission Development. AltaLink estimates the in-service cost of the TFO Facilities to be approximately $5 million.[12] The AESO has been advised by PRE that PRE's Facility Proposal will address the requirements of Commission Rule 007, Section 6.2.2, NID24.[13]

In accordance with the ISO tariff, the AESO has determined that there are no system-related costs associated with the Proposed Transmission Development.

2.4 Transmission Development Alternatives – The following transmission alternatives to the Proposed Transmission Development were examined:

1. Connect the Facility to the 138 kV transmission system using a T-tap configuration – The alternative involves adding approximately 10 kilometres of new 138 kV circuit to connect PRE's proposed Halsbury 306S substation and the existing 138 kV transmission line 601L using a T-tap configuration. This alternative was ruled out because it is not considered to be technically feasible, given the limited thermal capacity of the existing transmission line 601L and the limited transformation capacity of the existing transformers by which the transmission line 601L is connected to the transmission system.
2. Connect the Facility to the 138 kV transmission system using a radial configuration – This alternative involves adding approximately 15 kilometres of new 138 kV circuit to connect PRE's proposed Halsbury 306S substation to the existing Jenner 275S substation using a radial configuration. This alternative would also involve upgrades at the existing Jenner 275S substation, including adding a 240/138 kV transformer and expanding the 138 kV and 240 kV busses. This alternative was ruled out because of the increased transmission

[12] The cost in the TFO's cost estimate is in nominal dollars using a base year of 2015 with escalation considered. Further details of this cost estimate can be found in Appendix B, with an approximate accuracy level of +20%/-10%.

[13] Please refer to the letter included as Appendix E of this Application.

developments and hence, increased cost compared to the Proposed Transmission Development.

The Proposed Transmission Development was selected as the preferred transmission alternative and forms the basis for the cost estimates and the connection assessment described herein.

2.5 Connection Assessment – Power flow, transient stability, and short-circuit analyses were conducted to assess the impact that the Proposed Transmission Development and the associated load and generation would have on the transmission system. Power flow and short-circuit analyses were conducted prior to and following connection of the Facility, and transient stability analysis was performed following connection of the Facility.

The pre-connection assessment identified system performance issues. Under certain Category B conditions, thermal criteria violations and voltage range criteria violations were observed. Real time operational practices and existing and planned RASs can be used to mitigate most of the pre-connection system performance issues. However, mitigation of the observed thermal criteria violations on the 144 kV transmission line 7L159 following the loss of the 240 kV transmission line 9L20 is dependent on the restoration of the 144 kV transmission line's seasonal continuous thermal rating.

The post-connection assessment identified the same system performance issues that were identified in the pre-connection assessment as well as additional system performance issues. Under Category B conditions, some of the thermal criteria violations that were observed in the pre-connection assessment were intensified. New thermal criteria violations were also observed in the post-connection assessment under certain Category B contingencies. Real time operational practices and existing and planned RASs can be used to mitigate most of the post-connection system performance issues. However, mitigation of the observed thermal criteria violations on the 144 kV transmission lines 7L159 and 7L16 following the loss of the 240 kV transmission line

9L20 is dependent on the restoration of the 144 kV transmission lines' respective seasonal continuous thermal ratings.[14]

2.6 AESO Forecast and Transmission System Plans – The AESO's corporate forecast for the region is consistent with the load and generation associated with the Proposed Transmission Development.[15] The AESO's corporate forecasts are used by the AESO to assess the adequacy of the regional transmission system and as a basis for identifying the need for transmission system expansion or enhancement. Therefore, the need associated with the Proposed Transmission Development is consistent with the AESO's long-term plans for the region.

2.7 Transmission Dependencies – As discussed in Section 2.5, the Proposed Transmission Development is dependent on the restoration of the respective seasonal continuous thermal ratings of the 144 kV transmission lines 7L159 and 7L16. The AESO plans to direct the TFOs in the area where these transmission lines are located to restore the seasonal continuous thermal ratings of transmission lines 7L159 and 7L16. These dependencies need to be in service prior to energization of the Proposed Transmission Development. The Proposed Transmission Development is not dependent on any other plans of the AESO to expand or enhance the transmission system.

2.8 AESO Participant Involvement Program – The AESO directed AltaLink to assist the AESO in conducting a participant involvement program (PIP). The AESO also required the market participant to assist the AESO in conducting a PIP as a condition to the AESO's approval of the Market Participant Proposal.

Between November 2015 and May 2016, AltaLink, the market participant, and the AESO used various methods to notify occupants, residents, landowners, government bodies, agencies and stakeholder groups in the area where the AESO has reasonably

[14] The connection assessment is included as Appendix A.

[15] Section 5 of the *AESO 2016 Long-term Outlook* discusses the South Planning Region, which includes the Proposed Transmission Development area.

determined that transmission facilities could be installed to implement the Proposed Transmission Development. Additionally, the AESO notified the public in the area where transmission facilities could be installed to implement the Proposed Transmission Development of its intention to file this Application with the Commission for approval. No concerns or objections have been raised regarding the need for the Proposed Transmission Development.[16]

2.9 Information Regarding Rule 007, Section 6.2.2, NID23(3) – The AESO has been advised that both the TFO Facility Proposal and the PRE Facility Proposal address the requirements of Commission Rule 007, Section 6.2.2, NID23(3).[17] In consideration of that fact, and as the filing of the Application is combined with both Facility Proposals, the AESO has not undertaken a separate assessment of the sort contemplated in Commission Rule 007, Section 6.2.2, NID23(3).

2.10 Confirmation Date – In the event that the Proposed Transmission Development is not in-service by April 2, 2018, which is six months following the scheduled in-service date of October 2, 2017, the AESO will inform the Commission in writing if the need to expand or enhance the transmission system described in this Application continues, and if the technical solution described in this Application approval continues to be the AESO's preferred technical solution.[18]

2.11 Approval is in the Public Interest – Having regard to the following:

- the transmission planning duties of the AESO as described in Sections 29, 33 and 34 of the Act;
- the SASR;
- the connection assessment;
- information obtained from AESO PIP activities; and

[16] Further information regarding the AESO's PIP for this Application is included in Appendix C.

[17] Please refer to the TFO's and PRE's letters included as Appendix D and Appendix E, respectively.

[18] A detailed project schedule can be found in each of the TFO's and PRE's Facility Proposals.

- the AESO's long-term transmission system plans;

it is the conclusion of the AESO that the Proposed Transmission Development provides a reasonable opportunity for the market participant to exchange electricity. In consideration of these factors, the AESO submits that approval of this Application is in the public interest.

3 Request to Combine this Application with Facility Proposals for Consideration in a Single Process

3.1 Pursuant to Section 35(1)(a) of the Act, the AESO has directed AltaLink to prepare a Facility Proposal to meet the need identified. Pursuant to Section 36 of the Act, the AESO has conditionally approved the Market Participant Proposal, and has specified the time within which PRE must apply for a permit to construct, and a licence to jointly operate with AltaLink, the PRE Facilities.

The AESO understands that each of the TFO and PRE Facility Proposals will be filed shortly.[19] The AESO requests, and expects that AltaLink and PRE will request, that this Application be combined with the TFO and PRE Facility Proposals for consideration by the Commission in a single process, as contemplated by Section 15.4 of the HEEA and Section 6 of Commission Rule 007.

3.2 While it is believed that this Application and the related Facility Proposals will be materially consistent, the AESO respectfully requests that in its consideration of each, the Commission be mindful of the fact that the documents have been prepared separately and for different purposes. The purpose of this Application is to obtain approval of the need to respond to the market participant's request for system access service and provide a preliminary description of the manner proposed to meet that need. In contrast, the Facility Proposals will contain more detailed engineering and designs associated with the Proposed Transmission Development and seek approval for the construction and operation of specific facilities.

[19] The AESO understands that the TFO intends to file a Facility Proposal relating to this Application to be titled *Jenner Substation Circuit Breaker Addition.* The AESO also understands that PRE intends to file a Facility Proposal relating to this Application to be titled *Transmission Line 949L and Interconnection Application for the Jenner Wind Power Project*.

4 Relief Requested

4.1 The AESO submits that its assessment of the need to meet the market participant's request for transmission system access service is technically complete and that approval is in the public interest.

4.2 In the event that the proposed facilities are not in-service by April 2, 2018, which is six months following the scheduled in-service date of October 2, 2017, the AESO will inform the Commission in writing if the need to expand or enhance the transmission system described in this Application continues, and if the technical solution described in this Application approval continues to be the AESO's preferred technical solution.

4.3 For the reasons set out herein, and pursuant to Section 34 of the Act, the AESO requests that the Commission approve this Application, including issuing an approval of the need to respond to the market participant's request for system access service, and to connect the Facility, including the following:

The PRE Facilities:

A. Add a new 240 kV circuit, designated as 949L, to connect PRE's proposed Halsbury 306S substation to the existing Jenner 275S substation;

B. Modify, alter, add or remove equipment, including switchgear, and any operational, protection, control and telecommunication devices required to undertake the work as planned and ensure proper integration with the transmission system.

The TFO Facilities:

C. Modify the existing Jenner 275S substation, including adding one 240 kV circuit breaker; and

D. Modify, alter, add or remove equipment, including switchgear, and any operational, protection, control and telecommunication devices required to undertake the work as planned and ensure proper integration with the transmission system.

All of which is respectfully submitted this 17th day of May, 2016.

Alberta Electric System Operator

_____

Warren Clendining

Manager, Transmission Regulation Projects

PART B – APPLICATION APPENDICES

The following appended documents support the Application (Part A).

APPENDIX A **Connection Assessment –** Appendix A contains the *Engineering Study Report, Joss MPC Wind Aggregated Generating Facility (WAGF)* that assesses the transmission system performance prior to and following the connection of the Proposed Transmission Development. Appendix A describes the study scope and methodology, assumptions, reliability criteria and detailed results.

APPENDIX B **TFO Capital Cost Estimates –** Appendix B contains detailed cost estimates corresponding to the Proposed Transmission Development. The estimates have been prepared by AltaLink at the direction of the AESO. These estimates were prepared to an approximate accuracy level of +20%/-10%, which exceeds the accuracy required by Commission Rule 007, NID24.

APPENDIX C **AESO PIP –** Appendix C contains a summary of the PIP activities, conducted in accordance with requirement NID27 and Appendix A2 of Commission Rule 007, regarding the need to respond to the market participant's request for system access service. Copies of the relevant materials distributed during the PIP are attached for reference.

APPENDIX D **TFO Information Regarding Rule 007, Section 6.2.2 – NID23(3) –** Appendix D contains a letter provided by AltaLink confirming that the requirements of Commission Rule 007, NID23(3) will be addressed within AltaLink's Facility Proposal.

APPENDIX E **PRE Information Regarding Rule 007, Section 6.2.2 – NID23(3) and NID24 –** Appendix E contains a letter provided by PRE confirming that the requirements of Commission Rule 007, NID23(3) and NID24 will be addressed within PRE's Facility Proposal.

APPENDIX F **AESO Transmission Planning Criteria – Basis and Assumptions –** The AESO has revised the *Transmission Reliability Criteria, Part II Transmission*

System Planning Criteria, Version 0, dated March 11, 2005 primarily to remove criteria that are now included in the Transmission Planning (TPL) Standards.[20] Appendix F contains the *Transmission Planning Criteria – Basis and Assumptions,* Version 1, which includes the applicable thermal and voltage limits in support of the TPL standards. Planning studies that are included in this Application meet the relevant performance requirements of the specified TPL standards.

[20] TPL Standards are included in the current Alberta Reliability Standards.

PART C – REFERENCES

i. **AESO Planning Duties and Responsibilities –** Certain aspects of AESO duties and responsibilities with respect to planning the transmission system are described in the Act. For example, Section 17, Subsections (g), (h), (i), and (j), describe the general planning duties of the AESO.[21] Section 33 of the Act states that the AESO "must forecast the needs of Alberta and develop plans for the transmission system to provide efficient, reliable, and non-discriminatory system access service and the timely implementation of required transmission system expansions and enhancements." Where, as in this case, the market participant (refer to note ii below) is requesting system access service, and the request requires or may require the expansion or enhancement of the capability of the transmission system, the AESO must prepare and submit for Commission approval, as per Section 34(1)(c), a needs identification document that describes the need to respond to requests for system access service, including the assessments undertaken by the AESO regarding the manner proposed to address that need. Other aspects of the AESO's transmission planning duties and responsibilities are set out in Sections 8, 10, 11, and 15 of the *Transmission Regulation*.

ii. **Duty to Provide Transmission System Access –** Section 29 of the Act states that the AESO "must provide system access service on the transmission system in a manner that gives all market participants wishing to exchange electric energy and ancillary services a reasonable opportunity to do so."

iii. **AESO Planning Criteria –** The AESO is required to plan a transmission system that satisfies applicable reliability standards. Transmission Planning (TPL) standards are included in the Alberta Reliability Standards, and are generally described at: http://www.aeso.ca/rulesprocedures/17006.html.[22]
In addition, the AESO's *Transmission Planning Criteria – Basis and Assumptions* is included in Appendix F.

iv. **AESO Connection Process –** For information purposes, the AESO Connection Process, which changes from time to time, is generally described at: http://www.aeso.ca/connect[23]

[21] The legislation and regulations refer to the Independent System Operator or ISO. "AESO" and "Alberta Electric System Operator" are the registered trade names of the Independent System Operator.

[22] This link is provided for ease of reference and does not form part of this Application.

[23] This link is provided for ease of reference and does not form part of this Application.

v. **Application for Approval of the Need to Respond to a Request for System Access Service –** This Application is directed solely to the question of the need to respond to a request for system access service, as more fully described in the Act and the *Transmission Regulation*. This Application does not seek approval of those aspects of transmission development that are managed and executed separately from the needs identification document approval process. Other aspects of the AESO's responsibilities regarding transmission development are managed under the appropriate processes, including the ISO rules, Alberta reliability standards and the ISO tariff, which are also subject to specific regulatory approvals. While the Application or its supporting appendices may refer to other processes or information from time to time, the inclusion of this information is for context and reference only.
Any reference within the Application to market participants or other parties and/or the facilities they may own and operate or may wish to own and operate, does not constitute an application for approval of such facilities. The responsibility for seeking such regulatory or other approval remains the responsibility of the market participants or other parties.

vi. **Directions to the TFO –** Pursuant to Subsection 35(1) of the Act, the AESO has directed the TFO, in whose service territories the need is located, to prepare a Facility Proposal for the TFO Facilities to meet the need identified. The Facility Proposal is also submitted to the Commission for approval. The TFO has also been directed by the AESO under Section 39 of the Act to prepare a proposal to provide services to address the need for the Proposed Transmission Development. The AESO has also directed the TFO, pursuant to Section 39 of the Act and Section 14 of the *Transmission Regulation*, to assist in the preparation of the AESO's Application.

vii. **Capital Cost Estimates –**The provision of capital costs estimates in the Application is for the purposes of relative comparison and context only. The AESO's responsibilities in respect of project cost reporting are described in the *Transmission Regulation*, including Section 25, and Section 9.1 of the ISO rules.