**In the Matter of the Need for the Paintearth Wind Project 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***

Amended Application of the Alberta Electric System Operator for Approval of the

# Paintearth Wind Project Connection

# Needs Identification Document

**Date:** December 3, 2020

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# PART A - APPLICATION

## 1 Introduction

**1.1 Background –** On December 15, 2017, the Alberta Electric System Operator (AESO) filed the *Paintearth Wind Project Connection Needs Identification Document*[1] (Original Application) with the Alberta Utilities Commission (Commission). On March 8, 2018, the Commission placed the Original Application in abeyance until a decision was made on the applications in Proceeding 22726.[2] The Paintearth Wind Power Plant and the associated Lanes Lake 973S substation were approved by the Commission on January 22, 2020.[3]

On February 3, 2020, the AESO informed the Commission that it had approved a change submitted by Paintearth Wind Project LP, by its general partner Paintearth Wind Project Ltd. (Market Participant), to the in-service date of the Proposed Transmission Development (defined below in Section 1.3). The AESO also informed the Commission that this change could result in the AESO determining that the NID application should be amended or withdrawn.[4]

On April 30, 2020, the AESO informed the Commission that it was still reviewing its NID application[5] and the Commission subsequently advised the proceeding would continue to be held in abeyance and instructed the AESO to provide an update no later than July 2, 2020.[6] Subsequently, the AESO advised the Commission on June 24, 2020 that the Original Application would be amended and filed on or before November 30, 2020.[7]

[1] Application 23206-A001 in Proceeding 23206, Exhibit 23206-X0001.

[2] Exhibit 23206-X0044.

[3] The *Paintearth Wind Project* was originally approved by the Commission on January 22, 2020 in Decision 22726-D01-2020 and Power Plant Approval 22726-D02-2020. [Paintearth Approval].

[4] Exhibit 23206-X0049.

[5] Exhibit 23206-X0052.

[6] Exhibit 23206-X0053.

[7] Exhibit 23206-X0054.

The AESO now considers it appropriate to amend the Original Application in accordance with Section 34(2) of the *Electric Utilities Act* (Act). This amended Paintearth Wind Project Connection Needs Identification Document (Amended Application) replaces the Original Application.

**1.2 Application –** Pursuant to Section 34(1)(c) of the Act, and in accordance with further provisions set out in legislation,[8] the AESO applies to the Commission for approval of the Amended Application. This application is submitted in accordance with AUC Rule 007, Section 6.2.2, *ISO Abbreviated Needs Identification Document Application Information Requirements for System Access Service Requests by Generators*.

**1.3 Application Overview –** The Market Participant has requested system access service to connect its approved Paintearth Wind Project[9] (the Facility) to the transmission system in the Halkirk area (AESO Planning Area 42, Hanna). The Facility includes an approved collector substation, designated as the Lanes Lake 973S substation. The Market Participant expects the Facility to be commercially operational by Q2, 2023.

The Market Participant's request includes a new Rate STS, *Supply Transmission Service*, contract capacity of 150 MW and a new Rate DTS, *Demand Transmission Service*, contract capacity of 1 MW in the Halkirk area. The Market Participant's request can be met by adding the proposed Pioneer 805S substation, two 240 kV circuits to connect the proposed Pioneer 805S substation to the existing 240 kV transmission line 9L93 using an in-and-out configuration, and one 240 kV circuit to connect the Facility to the proposed Pioneer 805S substation (the Proposed Transmission Development, as further described in Section 2.2). The scheduled in-service date for the Proposed Transmission Development is April 1, 2023.

[8] 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 (AUC Rule 007).

[9] Paintearth Approval*, supra* note 3.

This Amended Application describes the need to respond to the Market Participant's request for system access service, and the AESO's determination of the manner in which to respond to the request. Having followed the AESO Connection Process,[10] the AESO has determined that the Proposed Transmission Development provides a reasonable opportunity for the market participant to exchange electric energy and ancillary services. The Proposed Transmission Development is consistent with the AESO's long-term plans for the Central Planning Region, which includes the Halkirk area. The AESO submits this Amended Application to the Commission for approval in accordance with the AESO's responsibility to respond to requests for system access service, having determined that the transmission development is required and is in the public interest.[11,12]

**1.4 AESO Directions to the Legal Owner of Transmission Facilities –** During the AESO Connection Process, the AESO issued various directions to the legal owners of transmission facilities (TFOs), in this case, ATCO Electric Ltd. (ATCO), and AltaLink Management Ltd. (AltaLink), in its capacity as general partner of AltaLink L.P., including directions to assist the AESO in preparing this Amended Application.[13]

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

[11] 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.

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

[13] 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 a reasonable opportunity to exchange electric energy and ancillary services.

The AESO, in consultation with the Market Participant and the TFOs, has determined that the Proposed Transmission Development is the preferred option to provide the Market Participant with a reasonable opportunity to exchange electric energy and ancillary services. In accordance with Section 34 of the Act, the AESO has determined that the Proposed Transmission Development will result in an expansion or enhancement of the transmission system thereby establishing the need for this Application. The Market Participant has made the appropriate applications to the AESO to obtain transmission system access service.

Through the AESO Connection Process, the AESO, in consultation with the Market Participant and the TFOs, has determined the Proposed Transmission Development and assessed the impacts that the Proposed Transmission Development and the associated generation would have on the Alberta interconnected electric system. The AESO has issued directions to ATCO to prepare a transmission facility proposal[14] (Facility Proposal) that corresponds with this Amended Application.[15]

**2.2 Proposed Transmission Development –** The Proposed Transmission Development involves connecting the Facility to the transmission system, and consists of the following elements:

[14] Also referred to as facility application, or FA, under AUC Rule 007.

[15] AltaLink has advised the AESO that its scope of work will not require a preparation of a Facility Proposal. As a result, the AESO did not direct AltaLink to prepare a Facility Proposal for this scope of work.

A. Proposed ATCO Development

1. Add the proposed Pioneer 805S substation, including two 240 kV circuit breakers;
2. Add two 240 kV circuits, approximately 100 meters each in length, with each circuit having a minimum capacity no less than the conductor rating of the existing transmission line 9L93, to connect the proposed Pioneer 805S substation to the existing transmission line 9L93 using an in-and-out configuration[16];
3. Add one 240 kV circuit, approximately 12 kilometers in length, with each circuit having a minimum capacity no less than the conductor rating of the existing transmission line 9L93, to connect the Facility to the proposed Pioneer 805S substation; and[17]
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.

B. Proposed AltaLink Development[18]

1. Add relays and install new or modify telecom equipment at the existing Buffalo Creek 526S and North Holden 395S substations; and
2. Modify, alter, add or remove equipment, including switchgear, and any operational, protection, control and telecommunication devices required to

[16] ATCO has estimated that the two 240 kV circuits that will connect the proposed Pioneer 805S substation to the existing 240 kV transmission line 9L93 will have a length of approximately 100 meters each. This is subject to change as routing and/or siting is finalized by ATCO.

[17] The 240 kV circuit will connect to the market participant's approved Lanes Lake 973S substation, which is part of the Facility. ATCO has estimated that the 240 kV circuit will have a length of approximately 12 kilometers. This is subject to change as routing and/or siting is finalized by ATCO.

[18] AltaLink has advised that this is the scope of work that would be required to meet the AESO's Functional Specification. Since AltaLink will not be providing a Facility Proposal, an additional level of detail has been provided for the AltaLink scope of work.

undertake the work as planned and ensure proper integration with the transmission system.

**2.3 Proposed Transmission Development Cost Estimate –** The AESO directed the TFOs to prepare a cost estimate for the Proposed Transmission Development, described in Section 2.2. ATCO has estimated the cost of its scope of work to be approximately $28 million.[19,20] In accordance with the ISO tariff, the AESO has determined that all costs associated with the Proposed Transmission Development will be classified as participant-related costs.

**2.4 Transmission Development Alternatives** – In addition to the Proposed Transmission Development, the AESO, in consultation with the market participant and the TFOs, examined two other transmission development alternatives to respond to the Market Participant's request for system access service:

1. **In-and-out connection to the 240 kV transmission line 9L59** – This alternative involves adding a new substation with three 240 kV circuit breakers; connecting the new substation to the 240 kV transmission line 9L59 using an in-and-out configuration; and adding a 240 kV circuit, approximately 15 kilometers in length, to connect the Facility to the proposed new substation.

   Alternative 1 was ruled out due to increased transmission development, and hence increased overall cost, compared to the Proposed Transmission Development.

2. **T-tap connection to the 240 kV transmission line 9L93** – This alternative involves adding a 240 kV circuit to connect the Facility to the 240kV transmission line 9L93 using a T-tap configuration.

   Alternative 2 is technically feasible, requires less transmission development and hence has a lower overall cost, compared to the Proposed Transmission

[19] The cost is in nominal dollars using a base year of 2020 with escalation considered. Further details of this cost estimate, which has an accuracy level of +20%/-10%, can be found in Appendix B.

[20] AltaLink's cost estimate was not available at the time of filing.

Development. As a result, Alternative 2 was the AESO's preferred connection alternative. However, the Market Participant indicated that it did not wish to proceed with Alternative 2 due to scheduling considerations. The Market Participant requested that the AESO instead consider proceeding with the Proposed Transmission Development and agreed to accept the higher costs associated with this option. The AESO determined that it would proceed with the Proposed Transmission Development as the preferred connection alternative. As a result, Alternative 2 was not selected for further study.

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

**2.5 Connection Assessment –** Power flow, transient stability and short-circuit studies were conducted to assess the impact that the Proposed Transmission Development and the associated generation would have on the transmission system. Power flow and short-circuit studies were conducted prior to and following the connection of the Proposed Transmission Development and transient stability studies were performed following connection of the Proposed Transmission Development.[21]

The pre-connection assessment identified system performance issues. Under certain Category B conditions, thermal criteria violations were observed. Real-time operational practices and the planned remedial action schemes (RASs) 134, 138, and 139 will be used to mitigate the pre-connection system performance issues.

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 certain Category B conditions. Some thermal criteria violations were exacerbated in the post-connection assessment compared to the pre-connection assessment and new thermal criteria violations were observed. Real-time operational

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

practices and modification of the planned RASs 134, 138, and 139 can be used to manage the post-connection thermal criteria violations. Modification of planned RASs 134, 138 and 139 could result in generation curtailment in excess of the Most Severe Single Contingency (MSSC) limit of 466 MW. Pre-contingency generation curtailment under the Category A condition may be required using real-time operational practices to prevent generation curtailment above the MSSC limit during Category B conditions.

A post-connection sensitivity assessment was conducted to assess the impact of the worst case scenario with additional renewable generation connections and without the Provost to Edgerton and Nilrem to Vermilion (PENV) Transmission Development.[22] With additional renewable generation and without PENV, thermal criteria violations were observed under the Category A condition. In addition, the same system performance issues that were identified in the post-connection assessment, as well as additional system performance issues were observed under certain Category B conditions. Real-time operational practices and modification of the planned RASs 134, 138, and 139 can be used, alone or in combination, to manage the Category B thermal criteria violations observed. Similar to the post-connection assessment, generation curtailment under the Category A condition may be required using real-time operational practices to prevent generation curtailment above the MSSC limit during Category B conditions.

Should Category A system performance issues materialize, the AESO will use operational procedures or other mitigation measures, to reduce the system performance issues to acceptable levels, which may include the application of Section 302.1 of the ISO rules, *Real Time Transmission Constraint Management* (TCM Rule). If the AESO determines in the future that congestion is reasonably anticipated to arise, the AESO will make an application to the Commission to obtain approval for an exception under Section 15(2) of the *Transmission Regulation* and include the AESO's mitigation plan within the

[22] The *Provost to Edgerton and Nilrem to Vermilion (PENV) Transmission System Reinforcement Needs Identification Document* was originally approved by the Commission on April 10, 2019 in Decision 23429-D02-2019.

application. The AESO will notify market participants if and when the AESO determines that it is necessary to apply to the Commission for approval of such an exception.

A post-connection sensitivity assessment was conducted with additional renewable generation connections and PENV in service. Category A thermal criteria violations were not observed with PENV in service. Similar to the post-connection assessment, thermal criteria violations were observed under certain Category B conditions. Real-time operational practices and modification of the planned RASs 134, 138, and 139 can be used, alone or in combination, to manage the Category B thermal criteria violations observed. Similar to the post-connection assessment, generation curtailment under the Category A condition may be required using real-time operational practices to prevent generation curtailment above the MSSC limit during Category B conditions.

**2.6 Transmission Dependencies –** The Proposed Transmission Development does not require the completion of any other AESO plans to expand or enhance the transmission system prior to connection. Currently, the planned PENV in-service date is prior to the in-service date of the Proposed Transmission Development. If PENV energizes after the Proposed Transmission Development, and the AESO determines that mitigation is required to address Category A thermal criteria violations, the AESO will develop operational procedures or other mitigation measures closer to the in-service date of the Proposed Transmission Development.

**2.7 AESO Participant Involvement Program –** The AESO directed ATCO to assist the AESO in conducting the AESO's participant involvement program (PIP). In September 2020, ATCO and the AESO used various methods to notify stakeholders about the need for development and the AESO's preferred option to respond to the system access service request. This included a notification to market participants that may be affected by the Proposed Transmission Development. The AESO has not received any indication of concerns or objections regarding the need for the Proposed Transmission Development or the AESO's preferred option to respond to the system access service

request. In October 2020, the AESO notified stakeholders of its intention to file this Amended Application with the Commission.[23]

**2.8 Environmental and Land Use Effects –** The AESO has been advised that ATCO's Facility Proposal addresses the environmental and land use effects requirements of AUC Rule 007, Section 6.2.2, NID23(3).[24] In consideration of this fact, and as the filing of the Amended Application is combined with ATCO's Facility Proposal, the AESO has not undertaken a separate assessment of the sort contemplated in AUC Rule 007, Section 6.2.2, NID23(3).

**2.9 Confirmation Date** – In the event that the Proposed Transmission Development is not in service by April 1, 2023, which is the scheduled in-service date, the AESO will determine if the need to expand or enhance the transmission system described in this Amended Application continues, and if the technical solution described in this Amended Application continues to be the AESO's preferred technical solution. In addition, if the AESO believes that the in-service date will not be met, and such delay will have a material impact on this Amended Application, the AESO will advise the Commission of the same.

ATCO's Facility Proposal addresses the requirements of AUC Rule 007, Section 6.2.2, NID25(2). In consideration of this fact, and as the filing of this Amended Application is combined with ATCO's Facility Proposal, the AESO has not undertaken an implementation schedule of the sort contemplated in AUC Rule 007, Section 6.2.2, NID25(2).

**2.10 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 Market Participant's request for system access service and the AESO's assessment thereof;

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

[24] Please refer to the letter included as Appendix D of this Application.

- the TFO's cost estimate for the Proposed Transmission Development;
- the AESO's connection assessment;
- the TFO's confirmation that it has addressed AUC Rule 007, Section 6.2.2, NID23(3);
- information obtained from AESO PIP activities; and
- 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 electric energy and ancillary services. In consideration of these factors, the AESO submits that approval of this Amended Application is in the public interest.

# 3 Relief Requested

3.1 The AESO submits that its assessment of the need to meet the Market Participant's request for system access service is technically complete and that approval is in the public interest.

3.2 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 to the transmission system, by means of the following transmission development:

A. Add the proposed Pioneer 805S substation, including two 240 kV circuit breakers;

B. Add two 240 kV circuits to connect the proposed Pioneer 805S substation to the existing transmission line 9L93 using an in-and-out configuration;

C. Add one 240 kV circuit to connect the Facility to the proposed Pioneer 805S substation; 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 3rd day of December, 2020.

Alberta Electric System Operator

*"Electronically Submitted by"*

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Robert Davidson, P.Eng.
Director, Customer Grid Access

# PART B – APPLICATION APPENDICES

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

**APPENDIX A** **Connection Assessment –** Appendix A contains the *AESO Engineering Connection Assessment – Paintearth Wind Project Connection* that assesses the transmission system performance prior to and following the connection of the Proposed Transmission Development. As part of the AESO Connection Process, the AESO defined the study scope, and provided the system models and study assumptions to the market participant who engaged a consultant to conduct the connection assessment studies. The AESO reviewed the results of the connection assessment studies prepared by the consultant, and finds the results of the connection assessment acceptable for the purposes of assessing the impacts of the Proposed Transmission Development on the transmission system.

**APPENDIX B** **TFO Capital Cost Estimate –** Appendix B contains a detailed cost estimate corresponding to the Proposed Transmission Development. This estimate has been prepared by ATCO. The cost estimate has an accuracy level which meets the accuracy required by AUC Rule 007, NID 24.

**APPENDIX C** **AESO PIP –** Appendix C contains a summary of the PIP activities conducted, in accordance with requirements of NID27 and Appendix A2 of AUC 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 AUC Rule 007, Section 6.2.2, NID23(3)–** Appendix D contains a letter provided by ATCO confirming that the requirements of AUC Rule 007, NID23(3) will be addressed within ATCO's Facility Proposal.

# PART C – REFERENCES

i. **AESO Planning Duties and Responsibilities –** Certain aspects of the AESO's 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.[25] 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 AESO has determined that 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 [Paintearth Wind Project LP in this case] wishing to exchange electric energy and ancillary services a reasonable opportunity to do so."

iii. **AESO Planning Criteria –** In accordance with the Act, 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 on the AESO website.

In addition, the AESO's *Transmission Planning Criteria – Basis and Assumptions* is included in Appendix A.

iv. **AESO Connection Process** – For information purposes, the AESO Connection Process, which changes from time to time, is generally described on the AESO website.

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*

[25] 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.

and the AESO's determination of the manner in which to respond to the request. 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 ATCO, in its capacity as a legal owner of transmission facilities, in whose service territories the need is located, to prepare a Facility Proposal to meet the need identified. The Facility Proposal is also submitted to the Commission for approval. The AESO has also directed ATCO, pursuant to Section 39 of the Act and Section 14 of the *Transmission Regulation*, to assist in the preparation of the AESO's Application. The TFOs have also been directed by the AESO under Section 39 of the Act to prepare a service proposal to address the need for the Proposed Transmission Development.

vii. **Capital Cost Estimates –** The provision of capital costs estimates in the Application is for the purposes of relative comparison and context only. The requirements applicable to cost estimates that are used for transmission system planning purposes are set out in Section 25 of the *Transmission Regulation*, AUC Rule 007, and Section 504.5 of the ISO rules, *Service Proposals and Cost Estimating*.