In the Matter of the Need for the Garden Plain Power 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*

Application of the Alberta Electric System Operator for Approval of the

Garden Plain Wind Power Project Connection

Needs Identification Document

Date: April 1, 2021

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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 *Garden Plain Wind Power Project Connection Needs Identification Document* (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*.

1.2 Application Overview – TransAlta Corporation (market participant), has requested system access service to connect its approved Garden Plain Wind Power Project[2] (the Facility) to the transmission system in the Castor area, (AESO Planning Area 42, Hanna). The Facility includes the proposed Garden Plain 1045S collector substation.[3] The market participant expects the Facility to be commercially operational by November 2022.

The market participant's request includes a new Rate STS, *Supply Transmission Service,* contract capacity of 130.0 MW and a new Rate DTS, *Demand Transmission Service*, contract capacity of 4.0 MW. The market participant's request can be met by adding one 240 kV circuit to connect the Facility to the existing 240 kV transmission line 9L59 using a T-tap configuration (the Proposed Transmission Development, as further described in Section 2.2). The scheduled in-service date for the Proposed Transmission Development is July 1, 2022.

[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 (AUC Rule 007).

[2] Decision 23651-D01-2019, Garden Plain Wind Energy I Inc*., Garden Plain Wind Power Project,* Proceeding 23651, Application 23651-A001, April 12, 2019.

[3] The market participant will be filing an application for approval of the Garden Plain 1045S substation concurrently with the AESO's NID.

This 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,[4] 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 Hanna area. The AESO submits this Application to the Commission for approval in accordance with the AESO's responsibility to respond to requests for system access service and having determined that transmission development is required and is in the public interest.[5,6]

1.3 AESO Directions to the TFOs – During the AESO Connection Process, the AESO issued various directions to the legal owners of transmission facilities (TFOs), in the applicable service areas, including directions to assist the AESO in preparing this Application.[7] In this case, the TFOs were ATCO Electric Ltd. (ATCO) and AltaLink Management Ltd., in its capacity as general partner of AltaLink L.P. (AltaLink).

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

[5] 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.

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

[7] 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 each TFO to prepare a transmission facility proposal[8] (Facility Proposal) that corresponds with this Application.

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

A. Proposed ATCO Development

1. Add one 240 kV transmission circuit approximately 160 metres in length, to connect the Facility to the existing 240 kV transmission line 9L59 using a T-

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

tap configuration.[9] The minimum capacity of the 240 kV circuit shall be the same as the existing 9L59, 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.[10]

B. Proposed AltaLink Development

1. 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]

2.3 Proposed Transmission Development Cost Estimate – The AESO directed ATCO and AltaLink to prepare cost estimates for the Proposed Transmission Development, described in Section 2.2. ATCO has estimated the cost of the Proposed ATCO Development to be approximately $3.0 million.[12] AltaLink has estimated the cost

[9] The 240 kV circuit will connect to the market participant's proposed Garden Plain 1045S substation, which is part of the Facilities. ATCO has estimated that the 240 kV circuit will have a length of approximately 160 metres. This is subject to change as routing and/or siting is finalized by ATCO.

[10] 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 ATCO's Facility Proposal. 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 ATCO's Facility Proposal. 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.

[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 AltaLink's Facility Proposal. 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 AltaLink's Facility Proposal. 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.

[12] The cost assumed an in-service date of October 1, 2021 and is in nominal dollars using a base year of 2020 with escalation Further details of this cost estimate, which has an accuracy level of +20%/-10%, can be found in Appendix B.

of the Proposed AltaLink Development to be approximately $2.3 million.[13] 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.

2.4 Transmission Development Alternatives – In addition to the Proposed Transmission Development, the AESO, in consultation with the market participant and ATCO, examined one other transmission development alternative to respond to the market participant's request for system access service:

1. **In-and-out Connection to the existing 240 kV transmission line 9L59 –** This alternative involves adding the ATCO portion of the Garden Plain 1045S substation, including three 240 kV circuit breakers, and connecting the substation to the existing 240 kV transmission line 9L59 using an in and out configuration. This alternative would require the addition of two 240 kV circuits, approximately 160 meters in length.[14]

This alternative was ruled out due to increased transmission development and hence increased overall 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 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 connection of the Proposed Transmission Development, and transient stability studies were

[13] The cost assumed an in-service date of October 1, 2021 and 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.

[14] ATCO would determine the actual length.

performed following the connection of the Proposed Transmission Development.[15] The connection assessment included base and sensitivity scenarios. Sensitivity scenarios were studied to assess the impact of renewable project additions, the Provost to Edgerton and Nilrem to Vermilion Transmission Development (PENV),[16] and the Central East Transfer-Out Transmission Development (CETO)[17] on the transmission system.

Base Scenarios

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 could 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 practices, and modification of the planned RASs 134, 138, 139 could 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.

Sensitivity Scenarios

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

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

[17] The *Needs Identification Document for Central East Transfer-out Transmission Development* was filed with the Commission on August 12,2020 in Proceeding 25469.

A pre-connection and post-connection sensitivity assessment were conducted to assess the impact of the addition of the Paintearth Wind Project connection (Paintearth)[18]. Both the pre-connection and post-connection sensitivity assessments identified the same system performance issues that were identified in the base scenario post-connection assessment. However, the post-connection sensitivity assessment including Paintearth, showed some additional system performance issues under certain Category B conditions. Some Category B thermal criteria violations were exacerbated in the post-connection sensitivity assessment compared to the base scenario post-connection assessment, and additional thermal criteria violations were observed. Real-time operational practices and modification of the planned RASs 134, 138, and 139, could be used to manage the pre-connection and post-connection thermal criteria violations. Similar to the base scenario 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. Once the PENV project was included in the sensitivity assessment scenarios along with Paintearth, most of the Category B thermal criteria violations were eliminated, and the majority of the remaining thermal criteria violations were reduced.

A post-connection sensitivity assessment was also conducted to assess the impact of additional renewable generation projects.[19] Thermal criteria violation was observed under the Category A condition in this post-connection sensitivity assessment. The same system performance issues that were identified in the post-connection base scenario assessment were also observed in the post-connection sensitivity assessment, along with some additional system performance issues, under certain Category B conditions. Some Category B thermal criteria violations in the post-connection base

[18] The *Paintearth Wind Project Connection Needs Identification Document* was originally approved by the Commission on March 24, 2021 in Decision 23206-D02-2021.

[19] Please refer to Section 4.2 of Appendix A, - *AESO Engineering Connection Assessment – Garden Plain Wind Power Project Connection*

scenario assessment were exacerbated in the post-connection sensitivity assessment that included the additional renewable generation projects and some new Category B thermal criteria violations were observed. Real-time operational practices, modification of the planned RASs 134, 138, 139 and the planned RAS for 7L224[20] could be used to manage the post-connection thermal criteria violations. Once the PENV project was included in the sensitivity assessment scenarios, along with the additional renewable generation projects, the thermal criteria violation observed under Category A was eliminated, most thermal criteria violations observed under Category B conditions were eliminated, and those that remained were reduced. Once both the PENV and CETO projects were included in the sensitivity assessment scenarios, along with the additional renewable generation projects, all but one of the Category B thermal criteria violations were eliminated.

Should Category A thermal criteria violations 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) to dispatch down effective generation. 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 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.

2.7 Transmission Dependencies – The Proposed Transmission Development does not require the completion of any other AESO plans to expand or enhance the capability of the transmission system prior to connection If additional generation projects advance

[20] The planned RAS for 7L224 was proposed as part of the *Pattern Lanfine North Wind Power Project Connection Needs Identification Document,* which was filed with the Commission on December 17,2020 in Proceeding 26176.

prior to the in-service date of PENV, 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.

2.8 AESO Participant Involvement Program – The AESO directed the TFOs to assist the AESO in conducting the AESO's participant involvement program (PIP). Between August 2018 and March 2021, ATCO, AltaLink 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. In February 2021, the AESO notified stakeholders of its intention to file this Application with the Commission.[21]

2.9 Environmental and Land Use Effects – The AESO has been advised that the TFOs' Facility Proposals address the environmental and land use effects requirements of AUC Rule 007, Section 6.2.2, NID23(3).[22] In consideration of this fact, and as the filing of the Application is combined with the TFOs' Facility Proposals, the AESO has not undertaken a separate assessment of the sort contemplated in AUC 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 July 1, 2022, which is the scheduled in-service date, the AESO will determine if the need to expand or enhance the transmission system described in this Application continues, and if the technical solution described in this Application continues to be the AESO's preferred technical solution. In addition, in the event that

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

[22] Please refer to the letters included as Appendix D of this Application.

the AESO believes that the in-service date will not be met, and such delay will have a material impact on this Application, the AESO will advise the Commission of the same.

The AESO has been advised that the TFOs' Facility Proposals address the requirements of AUC Rule 007, Section 6.2.2, NID25(2).[23] In consideration of this fact, and as the filing of this Application is combined with the TFOs' Facility Proposals, the AESO has not undertaken an implementation schedule of the sort contemplated in AUC Rule 007, Section 6.2.2, NID25(2).

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 market participant's request for system access service and the AESO's assessment thereof;
- the AESO's connection assessment;
- the TFOs' cost estimates for the Proposed Transmission Development;
- the TFOs' confirmation that AUC Rule 007, Section 6.2.2, NID23(3) has been addressed;
- 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 Application is in the public interest.

[23] *Ibid.*

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

3.1 Pursuant to Subsection 35(1) of the Act, the AESO has directed the TFOs to prepare Facility Proposals corresponding to this Application. The AESO understands that the TFOs' Facility Proposals will be filed shortly.[24] The AESO requests, and expects the TFOs will request, that this Application be combined with the Facility Proposals for consideration by the Commission in a single process. This request is consistent with Section 15.4 of *Hydro and Electric Energy Act* and Section 6 of AUC Rule 007.

3.2 While it is believed that this Application and the 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, having regard for the AESO's determination that the Proposed Transmission Development is required to provide the market participant with a reasonable opportunity to exchange electric energy and ancillary services. In contrast, the Facility Proposals will contain more detailed engineering and designs for the Proposed Transmission Development and seek approval for the construction and operation of specific facilities.

[24] The AESO understands that ATCO intends to file a Facility Proposal relating to this Application to be titled *Garden Plain Transmission Project.* The AESO understands that AltaLink intends to file a Facility Proposal relating to this Application to be titled *TransAlta Garden Plain - North Holden Fibre Optic Build*.

4 Relief Requested

4.1 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.

4.2 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 one 240 kV transmission circuit to connect the Facility to the existing 240 kV transmission line 9L59 using a T-tap configuration.

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.

All of which is respectfully submitted this 1st day of April 2021.

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 – Garden Plain Wind Power 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 found the results acceptable for the purposes of assessing the impacts of the Proposed Transmission Development on the transmission system.

APPENDIX B **TFO Capital Cost Estimates –** Appendix B contains detailed cost estimates corresponding to the Proposed Transmission Development. An estimate for the Proposed ATCO Development was prepared by ATCO, to an accuracy level of +20%/-10% which exceeds the accuracy required by AUC Rule 007, NID24. An estimate for the Proposed AltaLink Development was prepared by AltaLink to an accuracy level of +20%/-10% which exceeds the accuracy required by AUC Rule 007, NID24.

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 **Information Regarding AUC Rule 007, Section 6.2.2, NID23(3) and NID25(2) –** Appendix D contains letters provided by ATCO and AltaLink confirming that the requirements of AUC Rule 007, NID23(3) and NID25(2) will be addressed within

their respective TFO Facility Proposals.

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 [TransAlta Corporation in this case] wishing to exchange electric energy and ancillary services a reasonable opportunity to do so."

iii. **AESO Transmission 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

[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.

for system access service, as more fully described in the Act and the *Transmission Regulation*, 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 ATCO and AltaLink –** Pursuant to Subsection 35(1) of the Act, the AESO has directed ATCO and AltaLink, 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 and AltaLink, pursuant to Section 39 of the Act and Section 14 of the *Transmission Regulation*, to assist in the preparation of the AESO's Application. ATCO and AltaLink 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*.