

In the Matter of the Need for the Lanfine North Wind Power 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
Lanfine North Wind Power Project Connection
Needs Identification Document

Date: December 17, 2020

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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 *Lanfine North 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 – Pattern Development Lanfine Wind ULC (market participant), has requested system access service to connect its approved Lanfine North Wind Power Project² (the Facility) to the transmission system in the Oyen area (AESO Planning Area 42, Hanna). The Facility includes an approved collector substation, designated as the Buffalo Bird 601S substation. The market participant expects the Facility to be commercially operational in February 2023.

The market participant's request includes a new Rate STS, *Supply Transmission Service*, contract capacity of 145.0 MW and a new Rate DTS, *Demand Transmission Service*, contract capacity of 1.5 MW. The market participant's request can be met by adding one 144 kV circuit to connect the Facility to the existing Lanfine 959S substation and modification of the Lanfine 959S substation (the Proposed Transmission Development, as further described in Section 2.2). The scheduled in-service date for the Proposed Transmission Development is September 30, 2022.

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

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 22736-D01-2020: Pattern Development Lanfine Wind ULC, *Lanfine Wind Power Project*, Proceeding 22736, Application 22736-A001 to 22736-A005, January 27, 2020.

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respond to the request. Having followed the AESO Connection Process,³ 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.^{4,5}

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.⁶ 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).

³ For information purposes, refer to note iv of Part C of this Application for more information on the AESO Connection Process.

⁴ 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.

⁵ Note v of Part C of this Application describes the Application scope in more detail.

⁶ The directions are described in more detail in the following sections of this Application and in Part C, note vi.

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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 of the TFOs to prepare a transmission facility proposal⁷ (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

⁷ Also referred to as facility application, or FA, under AUC Rule 007.

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1. Add one 144 kV circuit, approximately 13 kilometres in length, with a minimum line rating of 161 MVA, to connect the Facility and the existing Lanfine 959S substation;⁸ 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.⁹

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.¹⁰

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 its scope of work to be approximately \$12.5 million.¹¹ AltaLink has estimated the cost of the

⁸ The 144 kV circuit will connect to the market participant's Buffalo Bird 601S substation, which is part of the Facility. The TFO has estimated that the 144 kV circuit will have a length of approximately 13 kilometers. This is subject to change as routing and/or siting is finalized by ATCO.

⁹ 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.

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 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.

¹¹ 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.

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Proposed AltaLink Development to be approximately \$2.3 million.¹² 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 three other transmission development alternatives to respond to the market participant's request for system access service:

1. **Radial 240 kV Connection to Lanfine 959S substation** – This alternative involves connecting the Facility and the existing Lanfine 959S substation using a radial 240 kV configuration. This alternative requires the addition of one 240 kV circuit, approximately 13 kilometres in length, and modifying the Lanfine 959S substation, including adding one 240 kV circuit breaker.
2. **In-and-out Connection to the 240 kV transmission line 1002L** – This alternative involves adding a switching station including three 240 kV circuit breakers and connecting the switching station to the existing 240 kV transmission line 1002L using an in-and-out configuration. This alternative also requires the addition one 240 kV circuit, approximately 60 km in length, to connect the Facility and the new switching station.
3. **Radial 144 kV Connection to Oyen 767S substation** – This alternative involves connecting the Facility and the existing Oyen 767S substation using a radial 144 kV configuration. This alternative requires the addition of one 144 kV circuit, approximately 22 kilometres in length, and modifying the Oyen 767S substation, including adding one 144 kV circuit breaker.

All three alternatives were ruled out due to increased transmission development, and hence increased overall cost, compared to the Proposed Transmission Development.

¹² 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.

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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 performed following connection of the Proposed Transmission Development.¹³

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 practices, modification of the planned RASs 134, 138, and 139, and a new 7L224 RAS, can be used, alone or in combination, 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.

¹³ The connection assessment is included as Appendix A.

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A post-connection sensitivity assessment was conducted to assess the impact of the worst case scenario with additional renewable generation connections. With additional renewable generation, 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, modification of the planned RASs 134, 138, and 139, and a new 7L224 RAS, can be used, alone or in combination, to manage the 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 determine its mitigation plan including a potential request to the Commission for an exception under Section 15(2) of the Transmission Regulation. 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 transmission system prior to connection.

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 May 2018 and September 2020, 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 responded to the questions and concerns raised by one

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of the notified market participants. No other questions or concerns have been raised by the other notified market participants.

Apart from the inquiry above, there are no outstanding 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 November 2020, the AESO notified stakeholders of its intention to file this Application with the Commission.¹⁴

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).¹⁵ 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 September 30, 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 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).¹⁶ In consideration of this fact, and as the filing of this Application is combined with TFOs' Facility Proposals, the AESO

¹⁴ Further information regarding the AESO's PIP for this Application is included in Appendix C.

¹⁵ Please refer to the letter included as Appendix D of this Application.

¹⁶ *Ibid*

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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.

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3 Request to Combine this Application with the Facility Proposal 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.¹⁷ 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.

¹⁷ The AESO understands that ATCO intends to file a Facility Proposal relating to this Application to be titled *Buffalo Bird to Lanfine Transmission Project*. The AESO understands that AltaLink intends to file a Facility Proposal relating to this Application to be titled *North Holden Fibre Optic Build*.

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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:

1. Add one 144 kV circuit to connect the Facility to the existing Lanfine 959S substation;
2. Modify the Lanfine 959S substation, including adding one 144 kV circuit breaker; and
3. 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 December, 2020.

Alberta Electric System Operator

"Electronically Submitted by"

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

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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 – Lanfine North 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 at the direction and request of the AESO, 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 the respective TFO’s Facility Proposal.

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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.¹⁸ 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 [Pattern Development Lanfine Wind ULC 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 for system access service, as more fully described in the Act and the *Transmission Regulation*,

¹⁸ 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.

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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*.