

In the Matter of the Need for the Claresholm Solar 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
Claresholm Solar Project Connection
Needs Identification Document

Date: June 26, 2019

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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 *Claresholm Solar Project Connection Needs Identification Document (Application)*.

1.2 Application Overview – Claresholm Solar Inc. (market participant), has requested system access service to connect its approved Claresholm Solar Project² to the transmission system in the Claresholm area (AESO Planning Area 49, Stavely). The Claresholm Solar Project consists of two separately metered aggregated solar generation facilities, referred to as Claresholm Solar Project A and Claresholm Solar Project B, and an approved collector substation, designated as the Granum 604S substation (collectively, the Facilities). The market participant expects the Facilities to be commercially operational on September 30, 2020.

The market participant's request includes:

- a new Rate STS, *Supply Transmission Service*, contract capacity of 56.875 MW and a new Rate DTS, *Demand Transmission Service*, contract capacity of 0.245 MW for the Claresholm Solar Project A; and
- a new Rate STS contract capacity of 73.125 MW and a new Rate DTS contract capacity of 0.315 MW for the Claresholm Solar Project B.

The market participant's request can be met by adding one 138 kV circuit to connect the Facilities to the existing 138 kV transmission line 180L using a T-tap configuration (the

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 The *Claresholm Solar Project* was originally approved by the Commission on April 10, 2019 in Decision 23841-D01-2019 and Power Plant Approval 23841-D02-2019.

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Proposed Transmission Development, as further described in Section 2.2). The scheduled in-service date for the Proposed Transmission Development is June 30, 2020.

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,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 South Planning Region, which includes the Claresholm 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 Legal Owner of Transmission Facilities – During the AESO Connection Process, the AESO issued various directions to the legal owner of transmission facilities, in this case, AltaLink Management Ltd., in its capacity as general partner of AltaLink, L.P. (AltaLink), including direction to assist the AESO in preparing this Application.⁶

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 AltaLink, 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 AltaLink, has determined the Proposed Transmission Development and has 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 AltaLink to prepare a transmission facility proposal⁷ (Facility Proposal) that corresponds with this Application. The City of Lethbridge, in its capacity as a legal owner of transmission facilities, (Lethbridge), has a small scope of work described below (Section 2.2 B) for which it has determined that a transmission facility proposal is not required.

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

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

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A. Proposed AltaLink Development

1. Add one 138 kV circuit to connect the Facilities to the existing 138 kV transmission line 180L using a T-tap configuration. The minimum capacity of the 138 kV circuit shall be the same as the existing 180L;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 Lethbridge Development¹⁰

1. Add protective relays and telecom equipment at the existing Bowron 674S substation; and
2. Modify, alter, add or remove other 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.

2.3 Proposed Transmission Development Cost Estimate – The AESO directed AltaLink to prepare a cost estimate for the Proposed AltaLink Development. AltaLink has estimated the cost of its scope of work to be approximately \$3 million.¹¹ In addition, Lethbridge has estimated the cost of the Proposed Lethbridge Development to be

⁸ The 138 kV circuit will connect to the market participant's approved Granum 604S substation, which is part of the Facilities. AltaLink has estimated that the 138 kV circuit will have a length of approximately 30 metres. This is subject to change as routing and/or siting is finalized by AltaLink.

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 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.

¹⁰ Lethbridge has advised that this is the scope of work that will be required to meet the AESO's Functional Specification.

¹¹ The cost is in nominal dollars using a base year of 2018 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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approximately \$0.2 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 AltaLink, examined three 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 lines 1037L or 1038L** – This alternative involves connecting the Facility to either the 240 kV transmission line 1037L or the 240 kV transmission line 1038L using an in-and-out configuration. This alternative would require the addition of a switching station, including three 240 kV circuit breakers and the addition of one 240 kV circuit, approximately 12 kilometres in length.
2. **Radial Connection to SC1 266S substation** – This alternative involves connecting the Facilities to the existing SC1 266S substation in a radial configuration. This alternative requires the addition of one 240 kV circuit, approximately 21 kilometres in length, and one 240 kV circuit breaker.
3. **Radial Connection to East Stavely 928S substation** – This alternative involves connecting the Facilities to the existing East Stavely 928S substation in a radial configuration. This alternative requires the addition of one 138 kV circuit, approximately 13 kilometres in length, and one 138 kV circuit breaker.

All three of these alternatives were ruled out due to increased transmission development, and hence overall increased cost, compared to the Proposed Transmission Development. The Proposed Transmission Development was selected as

¹² The cost is in nominal dollars using a base year of 2019 with escalation considered. Further details of this cost estimate, which has an accuracy level of +30%/-30%, can be found in Appendix B.

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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. The pre-connection system performance issues can be managed using real-time operational practices.

All of the system performance issues identified in the pre-connection assessment were also identified in the post-connection assessment. In addition, new system performance issues were observed. Under certain Category B conditions, thermal criteria violations were observed. The following mitigation measures can be used to mitigate the post-connection system performance issues:

- new remedial action scheme (RAS) for 463L;
- new RAS for 180L;
- new RAS for 725L;
- modify planned RAS for 172L¹⁴ and
- real-time operational practices

2.6 AESO Forecast and Transmission System Plans – The AESO’s corporate forecast for the South Planning Region is consistent with generation associated with the

¹³ The connection assessment is included as Appendix A.

¹⁴ Modified planned 172L RAS was proposed for the approved Stirling Wind Project in the Stirling Wind Project Connection NID, as originally approved by AUC Decision 22546-D01-2019 and Approval 22546-D02-2019.

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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. The need associated with the Proposed Transmission Development is consistent with the AESO's long-term plans for this region.

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 AltaLink to assist the AESO in conducting the AESO's participant involvement program (PIP). Between May 2018 and June 2019, 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 Project. One of the notified market participants raised questions and concerns, which the AESO responded to. The AESO also committed to address any further questions the notified market participant may have following the filing of the AESO's NID application. 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 June 2019, the AESO notified stakeholders of its intention to file this Application with the Commission.¹⁶

2.9 Information Regarding AUC Rule 007, Section 6.2.2, NID23(3) – The AESO has been advised that AltaLink's Facility Proposal addresses the requirements of AUC

¹⁵ The *AESO 2017 Long-term Outlook* provides forecasting information for the South Planning Region, which includes the Proposed Transmission Development area.

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

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Rule 007, Section 6.2.2, NID23(3).¹⁷ In consideration of this fact, and as the filing of the Application is combined with AltaLink'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).

2.10 Confirmation Date – In the event that the proposed facilities are not in service by June 30, 2020, which is the scheduled in-service date of the Project, 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 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 AltaLink's Facility Proposal addresses the requirements of AUC Rule 007, Section 6.2.2, NID25(2).¹⁸ In consideration of this fact, and as the filing of this Application is combined with AltaLink'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).

2.11 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;

¹⁷ Please refer to the letter included as Appendix D of this Application.

¹⁸ *Ibid*

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- cost estimates for the Proposed Transmission Development provided by the legal owners of transmission facilities;
- AltaLink'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 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 AltaLink to prepare a Facility Proposal corresponding with this Application. The AESO understands that AltaLink’s Facility Proposal will be filed shortly.¹⁹ The AESO requests, and expects AltaLink will request, that this Application be combined with the Facility Proposal 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 Proposal 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 Proposal will contain more detailed engineering and designs for the Proposed Transmission Development and seek approval for the construction and operation of specific facilities.

¹⁹ The AESO understands that AltaLink intends to file a Facility Proposal relating to this Application to be titled *Claresholm Solar Connection*.

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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 In the event that the proposed facilities are not in service by June 30, 2020, which is the scheduled in-service date of the Project, 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 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 to the transmission system, by means of the following transmission development:

- A. Add one 138 kV circuit to connect the Facilities to the existing 138 kV transmission line 180L using a T-tap configuration; and
- 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 26th day of June, 2019.

Alberta Electric System Operator

"Electronically Submitted by"

Robert Davidson, P.Eng.
Director, Transmission Connection Projects

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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 – Claresholm Solar 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 Capital Cost Estimates – Appendix B contains detailed cost estimates corresponding to the Proposed Transmission Development. An estimate for the Proposed AltaLink Development was prepared by AltaLink at the direction of the AESO, to an accuracy level which exceeds the accuracy required by AUC Rule 007, NID24. An estimate for the Proposed Lethbridge Development was prepared by Lethbridge to an accuracy level 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 AltaLink Information Regarding AUC Rule 007, Section 6.2.2, NID23(3) and NID25(2) – Appendix D contains a letter provided by AltaLink confirming that the requirements of AUC Rule 007, NID23(3) and NID25(2) will be addressed within AltaLink’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.²⁰ 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 [Claresholm Solar Inc. 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 at: <https://www.aeso.ca/rules-standards-and-tariff/alberta-reliability-standards/>²¹

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 at: <https://www.aeso.ca/grid/connecting-to-the-grid/connection-process/>²²

²⁰ 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.

²¹ This link is provided for ease of reference and does not form part of this Application.

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

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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*, 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 AltaLink** – Pursuant to Subsection 35(1) of the Act, the AESO has directed 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 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. AltaLink has 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*.