

In the Matter of the Need for the Rattlesnake Ridge 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
Rattlesnake Ridge Wind Project Connection
Needs Identification Document

Date: February 26, 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 *Rattlesnake Ridge Wind 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 – The market participant, BHE Canada Rattlesnake G.P. Inc. (BHE), has requested system access service to connect its proposed Rattlesnake Ridge Wind Project² (the Facility) to the transmission system in the City of Medicine Hat area (AESO Planning Area 4, Medicine Hat). The Facility includes BHE’s proposed collector substation, to be designated Rattlesnake Ridge 719S substation. BHE expects the Facility to be commercially operational in December 2021.

BHE’s request includes a new Rate STS, *Supply Transmission Service*, contract capacity of 114 MW and a new Rate DTS, *Demand Transmission Service*, contract capacity of 1.0 MW in the City of Medicine Hat area. BHE’s request indicated its intention to submit a proposal to construct and to temporarily operate some transmission facilities, as contemplated in Section 24.31 of the *Transmission Regulation* (TReg). BHE’s request can be met by adding one 138 kV circuit to connect the Facility to the existing 138 kV transmission line 879L 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 30, 2021.

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 BHE submitted an application for the proposed Facility to the Commission, which was registered on October 24, 2019, in Applications 25018-A001 and 25018-A002 under Proceeding No. 25018.

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This Application describes the need to respond to BHE’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 BHE 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 Medicine Hat 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 Market Participant Proposal – BHE submitted a proposal to the AESO, pursuant to Section 24.31 of the TReg (Market Participant Proposal), for the construction and temporary operation of a transmission facility, specifically the Proposed BHE Development, defined in Section 2.2 below.

A completed Market Participant Proposal was submitted by BHE on February 13, 2020. Subsequently, on February 21, 2020, the AESO conditionally approved the Market Participant Proposal pursuant to Section 36 of the Act, and in accordance with Section 36(2) of the ACT, specified the time within which BHE was to submit, for Commission approval under the *Hydro and Electric Energy Act* (HEEA), a transmission facility proposal⁶ (Facility Proposal) for the Proposed BHE Development.

1.4 AESO Directions to the TFO – During the AESO Connection Process, the AESO issued various directions to the legal owner of transmission facilities (TFO), in this case, AltaLink Management Ltd. (AltaLink), in its capacity as general partner of AltaLink L.P.,

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 Also referred to as facility application under AUC Rule 007.

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including a direction to submit, for Commission approval under the HEEA, a Facility Proposal for the Proposed AltaLink Development, as defined in Section 2.2.⁷

⁷ 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 BHE and the TFO, has determined that the Proposed Transmission Development is the preferred option to provide BHE 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. BHE has made the appropriate applications to the AESO to obtain transmission system access service.

Through the AESO Connection Process, the AESO, in consultation with BHE and the TFO, 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.

2.2 Proposed Transmission Development – The Proposed Transmission Development involves connecting the Facility to the transmission system, and consists of:⁸

- A. The Proposed BHE Development, which includes transmission facilities that, as contemplated by Section 24.31 of the TReg, will be constructed by BHE,

⁸ 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 BHE's Facility Proposal and AltaLink's Facility Proposal. Also, further details will be determined as detailed engineering progresses and BHE's operating requirements are finalized. Routing and/or siting of transmission facilities do not form part of this Application and are addressed in BHE's Facility Proposal and 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. BHE facilities that may subsequently be connected to the Proposed Transmission Development are the responsibility of BHE and are not included in the Application.

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and, thereafter, jointly operated by BHE and AltaLink for a temporary period of time specified in the proposal;⁹ and

B. The Proposed AltaLink Development.

The scope of the Proposed BHE Development and the Proposed AltaLink Development is described further below.

A. The Proposed BHE Development:

1. Add one 138 kV circuit to connect the Facility to the existing 138 kV transmission line 879L using a T-tap configuration. The minimum capacity of the 138 kV circuit shall be 130 MVA; and¹⁰
2. Modify, alter, add or remove equipment, including switchgear, and any operational, protection, control and telecommunication devices required to undertake the work as planned and ensure proper integration with the transmission system.

B. The Proposed AltaLink Development:

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.¹¹

2.3 Proposed Transmission Development Cost Estimate – BHE has prepared a cost estimate for the Proposed BHE Development, described in Section 2.2. The AESO

⁹ Where the AESO approves a proposal per section 24.31(7) of the TReg, BHE and incumbent TFO must, (a) before applying for any permit, licence or approval under the HEEA to construct or operate the transmission facility, enter into a written agreement under which ownership of the transmission facility will transfer from BHE to the incumbent TFO on the expiry of the temporary period referred to in subsection (3)(c) of the TReg.

¹⁰ The 138 kV circuit will connect to BHE's proposed Rattlesnake Ridge 719S substation, which is part of the Facility. BHE has estimated that the 138 kV circuit will have a length of approximately 50 metres. This is subject to change as routing and/or siting is finalized by BHE.

¹¹ AltaLink advised the AESO that its scope of work will consist of modifications to the existing 138 kV transmission line 879L to facilitate the creation of the T-tap connection, and protection, SCADA and telecommunication changes including installation of a telecommunication tower at Rattlesnake Ridge 719S substation.

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also directed the TFO to prepare a cost estimate for the Proposed AltaLink Development described in Section 2.2.

BHE has estimated the cost of the Proposed BHE Development to be approximately \$0.2 million.¹² The TFO has estimated the cost of the Proposed AltaLink Development to be approximately \$2.2 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 BHE, examined five other transmission development alternatives to respond to BHE’s request for system access service:

1. **In-and-Out Connection to 138 kV Transmission Line 879L** – This alternative involves connecting the Facility to the existing 138 kV transmission line 879L using an in-and-out configuration. This alternative would require the addition of a switching station, including three 138 kV circuit breakers and the addition of one 138 kV circuit, approximately 50 metres in length.
2. **Radial Connection to the Bullshead 523S substation** – This alternative involves connecting the Facility to the existing Bullshead 523S substation using a radial configuration. This alternative requires the addition of one 138 kV circuit, approximately 24 kilometres in length, and modification of the Bullshead 523S substation, including adding one 138 kV circuit breaker.
3. **Radial Connection to the Burdett 368S substation** – This alternative involves connecting the Facility to the existing Burdett 368S substation using a radial configuration. This alternative requires the addition of one 138 kV

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 +20%/-10%, can be found in Appendix B.

¹³ 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 +20%/-10%, can be found in Appendix B.

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circuit, approximately 35 kilometres in length, and modification of the Burdett 368S substation, including adding one 138 kV circuit breaker.

4. **In-and-Out Connection to the 138 kV Transmission Line 964L** – This alternative involves connecting the Facility to the 138 kV transmission line 964L using an in-and-out configuration. This alternative would require the addition of a switching station, including three 138 kV circuit breakers and the addition of one 138 kV circuit, approximately 22.5 kilometres in length.
5. **Radial Connection to the Whitla 251S substation** – This alternative involves connecting the Facility to the existing Whitla 251S substation using a radial configuration. This alternative requires the addition of one 240 kV circuit, approximately 33 kilometres in length, and modification of the Whitla 251S substation, including adding one 240 kV circuit breaker.

All five 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 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 the connection of the Proposed Transmission Development and transient stability studies were performed following connection of the Proposed Transmission Development.¹⁴

The pre-connection assessment identified existing system performance issues. Under certain Category B conditions, thermal criteria violations were observed. Existing RAS 149 can be used to mitigate the pre-connection system performance issues.

¹⁴ The connection assessment is included as Appendix A.

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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.

A new thermal criteria violation was observed under the Category A condition. Increasing the thermal rating of the existing 138 kV transmission line 610L by removing the distribution underbuild will alleviate this thermal criteria violation.¹⁵

Under certain Category B conditions, the thermal criteria violations that were observed in the pre-connection assessment were exacerbated in the post-connection assessment, and new thermal criteria violations were observed. The following mitigation measures can be used to mitigate the post-connection system performance issues observed under Category B conditions:

- existing RAS 149;
- a new 879L RAS; 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 Proposed Transmission Development.¹⁶ 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.

¹⁵ Increasing the thermal rating of the 138 kV transmission line 610L will be completed by AltaLink prior to the connection of the Facility and is described in the AESO’s Functional Specification included in AltaLink’s Facility Proposal.

¹⁶ The *AESO 2019 Long-term Outlook* provides forecasting information for the South Planning Region, which includes the Proposed Transmission Development area.

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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 TFO to assist the AESO in conducting the AESO’s participant involvement program (PIP). The AESO also required BHE to assist the AESO in conducting the AESO’s PIP as a condition to the AESO’s approval of the Market Participant Proposal.

Between November and December 2019, the TFO, BHE 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. One stakeholder raised questions and concerns, which the AESO responded to. No other questions or concerns have been raised to the AESO.

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 February 2020, the AESO notified stakeholders of its intention to file this Application with the Commission.¹⁷

2.9 Information Regarding AUC Rule 007, Section 6.2.2 NID 23(3) – The AESO has been advised that both the TFO Facility Proposal and BHE Facility Proposal address the requirements of AUC Rule 007, Section 6.2.2, NID23(3).¹⁸ In consideration of this fact, and as the filing of the Application is combined with both the TFO Facility proposal and BHE 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 July 30, 2021, 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

¹⁷ Further information regarding the AESO’s PIP for this Application is included in Appendix C.

¹⁸ Please refer to the letters included as Appendix D of this Application.

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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 both the TFO's Facility Proposal and BHE's Facility Proposal address the requirements of AUC Rule 007, Section 6.2.2, NID25(2). In consideration of this fact, and as the filing of this Application is combined with both the TFO's Facility Proposal and BHE'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).¹⁹

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;
- BHE's request for system access service and the AESO's assessment thereof;
- the AESO's connection assessment;
- the cost estimates for the Proposed AltaLink Development and the Proposed BHE Development;
- the TFO's and BHE's 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 BHE to exchange electric energy and ancillary services. In

¹⁹ *Ibid.*

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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 Proposals 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. Pursuant to Section 36 of the Act, the AESO has conditionally approved the Market Participant Proposal.

The AESO understands that the TFO Facility Proposal will be filed shortly.²⁰ BHE filed its Facility Proposal on October 24, 2019.²¹ The AESO requests, and expects the TFO and BHE 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 HEEA and Section 6 of AUC Rule 007.

3.2 While the AESO expects that this Application and the related Facility Proposals will be materially consistent, the AESO respectfully requests that in its consideration of each, the Commission be mindful of the fact that the documents have been prepared separately and for different purposes. The purpose of this Application is to obtain approval of the need to respond to BHE'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 BHE 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.

²⁰ The AESO understands that AltaLink intends to file a Facility Proposal relating to this Application to be titled *BHE Canada Rattlesnake G.P. Wind Power Connection Project*.

²¹ BHE submitted an application for the Proposed BHE Transmission Development to the Commission, which was registered on October 24, 2019, in Applications 25018-A004, under Proceeding No. 25018.

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4 Relief Requested

4.1 The AESO submits that its assessment of the need to meet BHE'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 July 30, 2021, 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 BHE'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 Facility to the existing 138 kV transmission line 879L 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 February, 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 – Rattlesnake Ridge 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 BHE 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. These estimates have been prepared by the TFO and BHE at the direction and request of the AESO. The cost estimates have 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 BHE’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 the TFO and BHE confirming that the requirements of AUC Rule 007, NID23(3) and NID25(2) will be addressed within their respective Facility Proposals.

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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.²² 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, BHE (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 [BHE Canada Rattlesnake G.P. 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/>²³

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/>²⁴

²² 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.

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

²⁴ 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 the TFO** – 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 the TFO, pursuant to Section 39 of the Act and Section 14 of the *Transmission Regulation*, to assist in the preparation of the AESO’s Application. The TFO 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*.