



Alberta Utilities Commission

In the Matter of the Need for the Capital Power Energy Centre 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 *Transmission Regulation*, AR 86/2007 and Alberta Utilities Commission Rule 007, all as amended

**Application of the Alberta Electric System Operator
for approval of the
Capital Power Energy Centre Connection
Needs Identification Document**

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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 *Capital Power Energy Centre Connection Needs Identification Document* (Application).

1.2 Application Overview – Capital Power (G4) Limited Partnership and ENMAX Genesee LP (collectively, Genesee LP) propose to become a market participant and have requested system access service for the proposed Capital Power Energy Centre (CPEC) to be located at the existing Genesee Generating Station west of the City of Edmonton in the AESO Wabamun Planning Area 40. The CPEC is comprised of two combined-cycle generating units designated as Genesee #4, with an expected in-service date of Q3 2019, and Genesee #5, with an expected in-service date of Q4 2020. Genesee LP's request includes a Rate STS, *Supply Transmission Service*, contract capacity of 505 MW for each of Genesee #4 and Genesee #5 and a total Rate DTS, *Demand Transmission Service*, contract capacity of 50 MW. Genesee LP's request can be met by expanding the existing Genesee 330P 500 kV switchyard at the Genesee Generating Station to accommodate the CPEC connection (the Proposed Transmission Development, as further described in Section 2.2). The scheduled in-service date for the Proposed Transmission Development is February 19, 2018.

This Application describes the need to respond to Genesee LP's request for system access service. Having followed the AESO Connection Process,² the AESO has determined that the Proposed Transmission Development provides a reasonable

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 *Transmission Regulation*, AR 86/2007 and Alberta Utilities Commission Rule 007, all as amended.

² For information purposes, refer to note iv of Part C of this Application for more information on the AESO's Connection Process.

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opportunity for the market participant to exchange electricity. The Proposed Transmission Development is consistent with the AESO's long-term plans for the Edmonton Region, which includes the Wabamun Planning Area 40. The AESO, in accordance with its responsibility to respond to requests for system access service, submits this Application to the Commission for approval.^{3,4}

1.3 AESO Directions to the TFO – During the AESO Connection Process, the AESO issued various directions to EPCOR Distribution & Transmission Inc. (EDTI), as the legal owner of transmission facilities (TFO), including direction to assist the AESO in preparing this Application.⁵

³ 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.

⁴ Note v of Part C of this Application describes the Application scope in more detail.

⁵ 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 (in this case, Genesee LP) a reasonable opportunity to exchange electric energy and ancillary services.

Genesee LP has requested system access service on the transmission system, thereby establishing the need for this Application. Through the AESO Connection Process, the AESO, Genesee LP, and the TFO have collaborated to determine the characteristics of the Proposed Transmission Development and to assess the impacts that the Proposed Transmission Development and the associated load and generation would have on the transmission system. The AESO has issued directions to the TFO to prepare a Facility Proposal⁶ to meet Genesee LP's request.

2.2 Proposed Transmission Development – The Proposed Transmission Development involves connecting the CPEC to the transmission system, including the following elements:

1. Extend the 500 kV buses at the existing Genesee 330P 500 kV switchyard and add two new diameters between the buses;
2. Add four 500 kV circuit breakers; 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.⁷

⁶ Also referred to as facility application, or FA, under Commission Rule 007.

⁷ 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 the TFO'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 the TFO's Facility

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2.3 Proposed Transmission Development Cost Estimates – The AESO directed the TFO to prepare a cost estimate for the Proposed Transmission Development. The TFO estimated the in-service cost of the Proposed Transmission Development, described in Section 2.2, to be approximately \$36 million.⁸ In accordance with the ISO tariff, the AESO has determined that there are no system-related costs associated with the Proposed Transmission Development.

2.4 Transmission Development Alternatives – No alternatives to the Proposed Transmission Development were identified. The Proposed Transmission Development forms the basis for the cost estimates and the Connection Assessment described herein.

2.5 Connection Assessment – Power flow, transient stability, and short-circuit analyses were conducted under Category A (all transmission elements in service or N-0), Category B (one transmission element out of service or N-1) and select Category C5 (two transmission elements out of service or N-2) conditions to assess the impact that the Proposed Transmission Development and the associated generation and load would have on the transmission system. Power flow and short-circuit analyses were conducted prior to, and following, connection of the CPEC and transient stability analysis was performed following connection of the CPEC.⁹

The AESO's analyses indicate that under N-0 conditions, the area transmission facilities would operate within nominal continuous ratings both prior to and following the CPEC connection.

Prior to the CPEC connection, the analyses identified the potential for several 138 kV and 240 kV transmission lines to operate above nominal continuous ratings under the studied N-1 and N-2 system conditions. Following the CPEC connection, many of these

Proposal. 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.

⁸ The cost is in nominal dollars using a base year of 2014 with escalation considered. Further details of this cost estimate can be found in [Appendix B](#), with an approximate accuracy level of +20%/-10%.

⁹ The Connection Assessment is included as [Appendix A](#).

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constraints are exacerbated and new constraints identified. Potential voltage criteria violations, which are not exacerbated by the CPEC connection, were observed under several of the studied contingencies. Analyses demonstrate that once the 2013 LTP area developments with planned ISDs through 2019 are in service, all thermal and voltage constraints, except those observed on 700L, will be alleviated. Since completing the CPEC connection assessment, the AESO released its *AESO 2015 Long-term Transmission Plan (2015 LTP)* which assumes the CPEC connection to be in service. The 2015 LTP includes a new 138 kV transmission line between Campbelltown 369S and Bretville 185S substations as part of the near-term East Edmonton system reinforcements, which will alleviate the identified 700L thermal constraints. Until the planned system reinforcements in the area are in service, the AESO will establish temporary mitigation measures, operating procedures and/or remedial action schemes, if required.

For the 2025 study year, the analyses identified several criteria violations related to forecast load growth in the area. The AESO will identify the need for system reinforcement as generation and load connection projects proceed through the AESO connection process.

Transient stability analysis show no stability concerns for the selected Category B or Category C5 contingencies and the short-circuit levels were found to be within the design capabilities of the nearby facilities.

The AESO also conducted a sensitivity analysis to assess the capability of the transmission system assuming connection of the 1000 MW ATCO Power Heartland Generation Facility in the Fort Saskatchewan area in addition to the CPEC. The sensitivity analysis shows no significant change to the results from the CPEC connection assessment. As the ATCO Power Heartland Generation Facility progresses through the AESO connection process, the associated engineering studies and needs identification document will include the CPEC.

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

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Proposed Transmission Development.¹⁰ 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. Therefore, the need associated with the Proposed Transmission Development is consistent with the AESO's long-term plans for the region. Future AESO needs identification documents in the area will assume the Proposed Transmission Development will be in-service for the date specified, unless new information indicates otherwise.

2.7 Transmission Dependencies – The Proposed Transmission Development is not dependent on the AESO's plans to expand or enhance the transmission system.

2.8 AESO Participant Involvement Program – The AESO directed the TFO to assist the AESO in conducting a participant involvement program (PIP).¹¹ Between February 2015 and February 2016, the TFO and the AESO used various methods to notify occupants, residents, landowners, government bodies, agencies and stakeholder groups (collectively, the Stakeholders) in the area where the AESO has reasonably determined that transmission facilities could be installed to implement the Proposed Transmission Development. Additionally, the AESO notified the public in the area where transmission facilities could be installed to implement the Proposed Transmission Development of its intention to file this Application with the Commission for approval. No concerns or objections have been raised regarding the need for the Proposed Transmission Development.¹²

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

¹⁰ Section 6.4 of the *AESO 2014 Long-term Outlook* discusses the Edmonton Region, which includes the Proposed Transmission Development area.

¹¹ The AESO's directions to the TFO were given under the previous Commission Rule 007, effective April 1, 2015. The AESO confirms that the PIP conducted in respect of this Application meets the requirements of Section 6.2.2, NID27 and Appendix A2 of the current Commission Rule 007, effective February 1, 2016.

¹² Further information regarding the AESO's PIP for this Application is included in [Appendix C](#).

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Commission Rule 007, Section 6.2.2 – NID23(3).¹³ In consideration of that fact, and as the filing of the Application is combined with the TFO's Facility Proposal, the AESO has not undertaken a separate assessment of the sort contemplated in Commission 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 August 19, 2018, which is six months following the scheduled in-service date of February 19, 2018, 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 approval continues to be the AESO's preferred technical solution.¹⁴

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 SASR;
- the Connection Assessment;
- 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 electricity. In consideration of these factors, the AESO submits that approval of this Application is in the public interest.

¹³ Please refer to the letter included as [Appendix D](#) of this Application.

¹⁴ A detailed project schedule can be found in the TFO's Facility Proposal.

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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 TFO to prepare a Facility Proposal to meet the need identified. The AESO understands that the TFO's Facility Proposal will be filed shortly.¹⁵ The AESO requests, and expects the TFO 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 the *Hydro and Electric Energy Act* and Section 6 of Commission 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 both, 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. 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.

¹⁵ The AESO understands that the TFO intends to file a Facility Proposal relating to this Application to be titled *Application for the Genesee 330P Substation Expansion*.

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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 transmission system access service is technically complete and that approval is in the public interest.

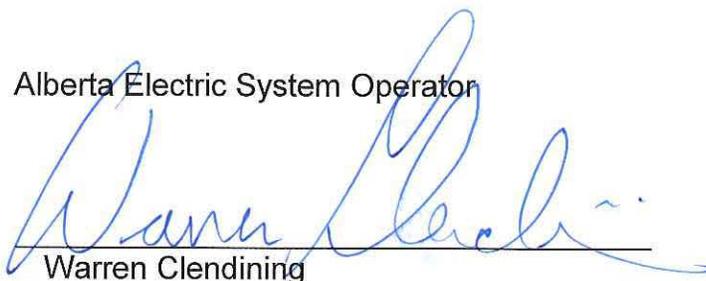
4.2 In the event that the proposed facilities are not in-service by August 19, 2018, which is six months following the scheduled in-service date of February 19, 2018, the AESO will inform the Commission in writing if the need to expand or enhance the transmission system described in this Application continues, and if the technical solution described in this Application approval 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, including the following:

- A. Extend the 500 kV buses at the existing Genesee 330P 500 kV switchyard and add two new diameters between the buses;
- B. Add four 500 kV circuit breakers; and
- C. 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 16th day of March, 2016.

Alberta Electric System Operator



Warren Clendinning

Manager, Transmission Connection Projects

Alberta Electric System Operator

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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 *Connection Engineering Study Report for AUC Application, Capital Power Energy Centre* that assesses the transmission system performance prior to and following the connection of the Proposed Transmission Development. [Appendix A](#) describes the study scope and methodology, assumptions, reliability criteria and detailed results.

[APPENDIX B](#) TFO Capital Cost Estimates – [Appendix B](#) contains detailed cost estimates corresponding to the Proposed Transmission Development. These estimates have been prepared by the TFO at the direction of the AESO, to an approximate accuracy level of +20%/-10%, which exceeds the accuracy required by Commission Rule 007, NID24.

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

[APPENDIX E](#) AESO Transmission Planning Criteria – Basis and Assumptions – The AESO has revised the *Transmission Reliability Criteria, Part II Transmission System Planning Criteria*, Version 0, dated March 11, 2005 primarily to remove criteria that are now included in the Transmission Planning (TPL) Standards.¹⁶ [Appendix E](#) contains the *Transmission Planning Criteria – Basis and Assumptions*, Version 1, which includes the applicable thermal and voltage limits in support of the TPL

¹⁶ TPL Standards are included in the current Alberta Reliability Standards.

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standards. Planning studies that are included in this Application meet the applicable performance requirements of the specified TPL standards (TPL-001-AB-0, TPL-002-AB-0, and TPL-003-AB-0).

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PART C – REFERENCES

- i. **AESO Planning Duties and Responsibilities** – Certain aspects of AESO 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.¹⁷ 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 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 wishing to exchange electric energy and ancillary services a reasonable opportunity to do so.”
- iii. **AESO Planning Criteria** – 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: <http://www.aeso.ca/rulesprocedures/17006.html>.¹⁸
In addition, the AESO’s *Transmission Planning Criteria – Basis and Assumptions* is included in [Appendix E](#).
- iv. **AESO Connection Process** – For information purposes, the AESO Connection Process, which changes from time to time, is generally described at: <http://www.aeso.ca/connect>¹⁹

¹⁷ 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.

¹⁸ This link is provided for ease of reference and does not form part of this Application.

¹⁹ 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*. 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 the TFO, 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 TFO has also been directed by the AESO under Section 39 of the Act to prepare a proposal to provide services to address the need for the Proposed Transmission Development. 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.
- vii. **Capital Cost Estimates** –The provision of capital costs estimates in the Application is for the purposes of relative comparison and context only. The AESO’s responsibilities in respect of project cost reporting are described in the *Transmission Regulation*, including Section 25, and ISO Rule 9.1.