REVIEW OF THE COST STATUS OF MAJOR TRANSMISSION PROJECTS IN ALBERTA

From The Transmission Facilities Cost Monitoring Committee

JUNE 2016 REPORT

REVIEW OF THE COST STATUS OF MAJOR TRANSMISSION PROJECTS IN ALBERTA - JUNE 2016

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Industry Abbreviations Commonly Found In This Report

Alberta Electric System Operator . . . . . (AESO)
Alberta PowerLine L.P. . . . . .(APL)
Alberta Utilities Commission . . . . . (AUC)
Allowance for Funds Used During Construction . . . . . (AFUDC)
AltaLink Management Ltd. . . . . (AltaLink)
ATCO Electric Ltd. . . . . (ATCO)
Critical Transmission Infrastructure . . . . . (CTI)
Direct Assign Capital Deferral Account . . . . .(DACDA)
Distribution Facility Owner . . . . . (DFO)
ENMAX Power Corp. . . . . .(ENMAX)
EPCOR Distribution and Transmission Inc. . . . . (EDTI)
EPCOR Utilities Inc. . . . . .(EPCOR)
Facility Application . . . . . .(FA)
General Tariff Application . . . . . (GTA)
High Voltage Direct Current . . . . . .(HVDC)
In-Service Date . . . . . .(ISD)
Long-Term Plan . . . . . .(LTP)
Needs Identification Document . . . . . .(NID)
Permit and Licence . . . . . .(P&L)
TransAlta Corp. . . . . (TransAlta)
TransAlta Utilities . . . . . .(TAU)
Transmission Facilities Cost Monitoring Committee . . . . . (TFCMC)
Transmission Facility Owner . . . . . (TFO)
Transportation Utility Corridor . . . . . (TUC)

Message From the Chair

This is the eleventh report from the Transmission Facilities Cost Monitoring Committee (referred to in this report as "TFCMC" or the "Committee") to its stakeholders. The report provides a detailed and structured summary of the cost, scope and schedule information of the transmission projects monitored by the Committee on a monthly basis for the period of November 1, 2015 to April 30, 2016.

During this period, the Committee examined the progression of eight major transmission projects, with the total cost of these projects estimated at $3.46[1] billion. A listing of these projects can be found in Section 1, while details for these projects are contained in Appendices B and C.

Section 2 of this report contains several key learnings and observations made by the Committee while monitoring the progress of the transmission projects.

Through the TFCMC's work in monitoring transmission project costs, it has and continues to identify opportunities to minimize costs. Since its inception, the Committee has made recommendations to take advantage of these opportunities. There are two new recommendations contained in this edition of the TFCMC report.

Section 3 provides an update on the status of all previous recommendations. The Alberta Electric System Operator (AESO) is continuing its work in enhancing and strengthening Rule 9.1 in the areas of cost estimating, cost reporting and procurement.

In response to a reduced project activity environment, and after a six-month trial, the Committee agreed to hold face-to-face meetings every second month, although project status reports will still be provided to TFCMC members each month.

In addition to issuing a limited quantity of hard copies of this semi-annual report, the report will be posted on the Utilities Consumer Advocate's website for access by any interested party.

Thank you for your continuing support. The TFCMC's next semi-annual report is scheduled for release in the spring of 2017. Your comments to improve the report will be much appreciated. Please email your comments to TFCMC@gov.ab.ca

Henry Yip
Chair, Transmission Facilities Cost Monitoring Committee

1 This figure does not include costs for Project 1590 – Fort McMurray West Area 500 kV Transmission Bulk System Reinforcement (FMACW) – as this project falls under a competitive procurement process. If the cost of Project 1590 is included, the projects would be valued at just over $4.89 billion.

1. Transmission Projects Covered Under The TFCMC's Mandate

The TFCMC has the authority to review records relating to the cost, scope and schedule of transmission facility projects expected to cost more than $100 million. These transmission projects include all lines and substations, which make up the transmission facilities required to transfer power between generators and loads.

Monitored Projects

The TFCMC monitored eight projects, during the period covered by this report, which have a combined Authorized Budget of just over $3.46 billion[2] (as detailed in Appendix B of this report).

The monitored projects, in alphabetical order, are:

- **CENTRAL EAST AREA TRANSMISSION DEVELOPMENT (CETD);** PROJECT 811 – Transmission development in Wainwright, Lloydminster, Provost, Vegreville and Cold Lake. **| Current Estimated Cost: $344 million |**
- **EDMONTON REGION 240 KV LINE UPGRADES (ERLU);** PROJECT 786 – Upgrading 240 kV lines in the Edmonton area and adding one 240 kV phase shifter at Livock substation to gain more capacity out of the existing 240 kV network. **| Current Estimated Cost: $178 million |**
- **FORT MCMURRAY WEST AREA 500 KV TRANSMISSION BULK SYSTEM REINFORCEMENT (FMACW);** PROJECT 1590 (formerly Project 838) – Construction of a West 500 kV transmission line from the Edmonton region to the Fort McMurray area. **| Current Estimated Cost: $1.433 billion |**
- **NORTHWEST (OF) FORT MCMURRAY TRANSMISSION DEVELOPMENT (NW FMM);** PROJECT 1180 – To provide service and connect future industrial customers in areas northwest of Fort McMurray where there are no transmission facilities. **| Current Estimated Cost: $235.1 million |**
- **RED DEER REGION TRANSMISSION DEVELOPMENT (RDTD);** PROJECT 813 – 240/138 kV transmission system reinforcements in the Red Deer area. **| Current Estimated Cost: $404.4 million |**
- **SOUTH AND WEST OF EDMONTON TRANSMISSION DEVELOPMENT (SWEATR);** PROJECT 850 – Transmission system reinforcement to the 138 kV systems south and west of the City of Edmonton. **| Current Estimated Cost: $306.6 million |**
- **SOUTHERN ALBERTA TRANSMISSION REINFORCEMENT (SATR);** PROJECT 787 – To accommodate wind generation in southern Alberta. **| Current Estimated Cost: $1.866 billion |**
- **THICKWOOD HILLS 240 KV TRANSMISSION DEVELOPMENT AND REACTIVE POWER REINFORCEMENT (THTD);** PROJECT 1186 – To connect the Fort McMurray West 500 kV transmission project to the existing transmission system in the Thickwood Hills area, west of Fort McMurray. **| Current Estimated Cost: $132.43 million |**

2 This figure does not include costs for Project 1590 – Fort McMurray West Area 500 kV Transmission Bulk System Reinforcement (FMACW) – as this project falls under a competitive procurement process. If the cost of Project 1590 is included, the projects would be valued at just over $4.89 billion.

2. TFCMC Observations To Date

As the Transmission Facilities Cost Monitoring Committee (TFCMC) moves forward with its mandate to review the cost of major transmission projects, it embarks on in-depth assessments of these undertakings (in the case of new projects[3]) or focuses on a more detailed analysis of existing ones and relevant issues based on the monthly reports[4] it receives.

This section describes some of the substantive observations made by the Committee during the six-month period covered by this report.

AESO 2016 Long-Term Outlook

At the May 2016 TFCMC meeting, the Alberta Electric System Operator (AESO) provided the Committee with its Long-Term Outlook (LTO) on key drivers of electricity demand and electricity generation development in Alberta.

The 2016 LTO is based on a broad set of assumptions supported by numerous forecasts from third parties. The 2016 LTO assumes Alberta's economy and corresponding load growth will recover within the next few years and takes into account the Alberta government's 2016 Climate Leadership Plan.

The LTO uses a reference case and three comprehensive scenarios to determine and prepare for a variety of potential future outcomes. The reference case is a mid-growth scenario supported by data and corresponding third-party forecasts. It assumes that crude oil prices, the oilsands industry, the Alberta economy and load growth will recover in the mid-to-long term. Under the reference case, the Alberta internal load[5] grows at a relatively high pace for the next three years due to oilsands projects currently in progress and a return to more normal weather patterns. It also assumes that the climate change policy will come into effect and that two-thirds of the coal fired generation capacity will be replaced by renewables by 2030.

The LTO also examined the impact of high growth with more baseload needs and the impact of low growth with less baseload needs.

The LTO did examine an alternate policy scenario using the same baseload assumption but with a stronger interpretation of the announced climate change policy. The impact of these scenarios on the transmission grid is being developed.

The 2016 LTO will be used as the foundation for the AESO's next Long-Term Transmission Plan, which will set out the AESO's current evaluation of Alberta's transmission system, and describe how the AESO will continue to provide efficient, reliable and non-discriminatory system access service and the timely implementation of required transmission system expansions and enhancements.

Fort McMurray Fire – Impact to the Electrical System

In light of the Rural Municipality of Wood Buffalo wildfire, which resulted in the evacuation of Fort McMurray in May 2016, the TFCMC inquired about the impact of the fire on electricity operations in the region.

The AESO advised that the massive forest fire, which covered an estimated area of almost 590,000 hectares (including the spread into Saskatchewan), had caused damage to a number of transmission lines.

One line, for example, sustained an 11-day outage as some structures were lost. The AESO said each day was different and on some days lines might be in danger and on other days that would not be the case.

At one point ATCO had more than 350 employees in Fort McMurray working to restore the power grid and assess the natural gas infrastructure.

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3 New projects added to the TFCMC's purview receive an in-depth review in addition to being inserted into the Committee's month-to-month examination process.

4 The TFCMC continues to receive monthly reports from the AESO, which originate from the TFOs, on all projects valued at $100 million and over.

5 Alberta Internal Load (AIL) is the most commonly used measure to gauge the demand of the province. AIL is defined as: "a number in MW: (i) that represents, in an hour, system load plus load served by on-site generating units, including those within an industrial system and the City of Medicine Hat; and (ii) which the ISO, using SCADA data, calculates as the sum of the output of each generating unit in Alberta and the Fort Nelson area in British Columbia, plus import volumes and minus export volumes (AESO *Consolidated Authoritative Document Glossary*, p3).

At the time of the TFCMC briefing in late May, the AESO expected that the situation would be stable by mid-June provided that no other lines or structures were lost. Electricity services, including the distribution network, were expected to be sufficient if the planned re-opening of Fort McMurray moved forward at the beginning of June.

Transmission Construction Costs

Transmission Facility Owners (TFOs) like AltaLink Management Ltd. (AltaLink) and ATCO Electric Transmission (ATCO) in Alberta incur a substantial portion of the costs of transmission line development during the construction phase of a transmission project.

Alberta TFOs have experienced major cost overruns on some projects and as result, the TFCMC undertook a review of construction costs to determine opportunities for savings while maintaining both quality and safety standards. Adherence to best practices during the planning and construction of transmission lines, and stations, can lead to reduced costs.

Since the TFOs competitively procure a significant portion of materials and labour needed to build transmission lines, the TFCMC focused on procurement practices. The TFCMC gathered various views on best practices related to the procurement of materials and labour from presentations to the Committee by third parties, with input from the TFCMC's consultants.

The TFCMC does not take any position with respect to the views set out below, but is interested in hearing the views of the TFOs in order to assist the Committee in its monitoring of the costs of major transmission projects in Alberta.

The Committee heard that construction costs may be minimized by adherence to several best practices:

1. Make as much information as possible known to potential bidders well in advance of construction, including soil conditions, right-of-way conditions, tower foundation requirements, tower designs, conductor and line hardware types, commissioning expectations, demobilization requirements and required clean up.
2. Competitive bid practices should maximize the number of bidders submitting quotations. TFOs should work to qualify potential bidders and should target at least three compliant bids.
3. Contract administration should be fair and equitable. Contract risks should be assumed by the party most capable of doing so. Specifications must be clear and concise and when conditions vary from tender documents, change orders should be discussed and agreed upon as soon as possible.
4. Materials management is a critical component of a successful project and TFOs should ensure that materials are on site in a timely fashion to avoid delays and escalating costs. Project design drawings and material testing should be complete before a project begins.
5. Contract business issues should be resolved in advance of construction. Adequate funding of mobilization costs and an agreed upon schedule of progress payments should be in place. Contractors must ensure that they have adequate equipment and qualified personnel to complete the work.
6. Landowner issues need to be resolved before construction begins and, as much as possible, harmonious relations should be maintained throughout the duration of the contract.
7. The contractor should follow best construction practices and be allowed to explore options for the use of cranes versus helicopters for tower erection, the use of ground mats, and the scheduling of the work with the TFO.
8. TFOs may explore the option of developing their own line construction crews, if conditions warrant it. TFOs may also examine splitting contracts into more manageable pieces or contracting out some functions, if savings can be attained.

Observations On New Projects

No new projects were added to the TFCMC's roster of monitored projects during the period covered by this report.

3. TFCMC Results to Date | Recommendations

This marks the eleventh semi-annual report that the TFCMC has released. In the 10 previous editions, a total of 11 recommendations have been made – all with the goal of enhancing the monitoring and management of transmission costs in Alberta. Nine of the recommendations were directed to the Alberta Electric System Operator (AESO) and two were made to Alberta Energy.

Instead of recommendations, the TFCMC's June 2013 report focused on a list of the Committee's Top 5 Transmission Priorities. This list came about as Alberta Energy initiated a review of its transmission cost management policy and sought input from leaders in the electricity sector[6].

Recommendations to the Alberta Electric System Operator

The AESO, as noted in earlier editions of this semi-annual report, has been proactive in its response to recommendations made by the Committee, adopting a majority of the TFCMC's recommendations. The TFCMC continues to be encouraged by the overall direction and response that the AESO has taken in regards to these recommendations.

Recommendations already implemented:

- **JUNE 2011 REPORT, RECOMMENDATION NUMBER 1:** That the AESO improve future NID estimates by including fully loaded costs – allowance for funds used during construction (AFUDC), escalation, engineering and supervision, and owners' costs.
- **JUNE 2011 REPORT, RECOMMENDATION NUMBER 2:** That the AESO improve the estimates in the AESO Long-Term Transmission Plan by employing third-party cost estimates or cost estimate verification as well as from benchmark data being compiled by AESO.
- **JUNE 2011 REPORT, RECOMMENDATION NUMBER 3:** That the AESO develop a transmission cost benchmarking competency and database.
- **JUNE 2011 REPORT, RECOMMENDATION NUMBER 4:** That the AESO enhance compliance of the material procurement provisions of Rule 9.1.
- **JUNE 2011 REPORT, RECOMMENDATION NUMBER 6:** That the AESO initiate a review process on the current framework for cost accountability.
- **DECEMBER 2012 REPORT, RECOMMENDATION NUMBER 1:** That the AESO, with assistance from TFCMC consultants, undertake a case study concerning the cost changes for Project 671 – from the NID through to the PPS and the authorized budget – and this should include lessons learned from the Yellowhead project and lessons about reporting under ISO Rule 9.1 (Compliance Monitoring).
- **DECEMBER 2013 REPORT, RECOMMENDATION NUMBER 1:** That the AESO take the necessary steps to change the relevant rules so that it is clear that it will only review change orders for scope and in-service date changes.

6 To see the TFCMC's Top 5 Transmission Priorities in their entirety, please consult the TFCMC's June 2013 semi-annual report. It can be found online at https://ucahelps.alberta.ca/regulatory-reporting.aspx

The remaining AESO recommendations

The AESO has expanded the following recommendation into the broader context of the TFCMC's earlier cost accountability recommendation. The AESO's goal is still to coordinate with the Alberta Utilities Commission on the development of a reporting protocol with respect to the treatment of transmission project costs.

- **DECEMBER 2011 REPORT, RECOMMENDATION NUMBER 2:** That for each Direct Assigned project, the AESO provide to the Alberta Utilities Commission a summary of the scope changes authorized by the AESO for that project including the following:

  I. The AESO's assessment on whether each scope change was needed;

  II. A summary of the alternatives available to meet each scope change;

  III. The AESO's assessment on whether the alternative recommended by the TFO to address each needed scope change was the most appropriate alternative; and

  IV. The AESO's assessment on whether the cost of each scope change as estimated by the TFO was reasonable.

This information would form part of the AUC's consideration, under section 25(4) of the *Transmission Regulation*, in determining the TFO's prudence in managing the cost of the Direct Assigned project.

June 2016 TFCMC Report update: *the AESO stated that it intends to provide a recommendation for the development of an AUC reporting protocol as it drafts and consults on revisions to ISO Rule 9.1.3 (Project Reporting).*

The AESO considers the following recommendation closed:

- **JUNE 2012 REPORT, RECOMMENDATION NUMBER 1:** That for each Direct Assigned Capital project estimated to cost in excess of $100 million[7] at the Needs Identification Document stage, the AESO will publish a cost benchmarking report at the time the Transmission Facility Owner files its Facility Application with the Alberta Utilities Commission for approval. To the extent that there are significant project cost changes between the Proposal to Provide Service stage and the TFO's application before the AUC for rate base approval, the AESO will update and publish its cost benchmark report.

The AESO notes that the AUC has not expressed any interest in receiving or using such a report. The AESO has established a protocol with the AUC for transfer of cost information when projects exceed the cost estimate threshold. The cost information includes reports gathered under AESO Rule 9.1 and if pertinent, AESO benchmarking analysis.

Further, the AESO has made the cost benchmarking database available to the public. Therefore any interested party may create their own benchmarking report, for example, if they are intervening in a TFO proceeding. The AESO processes for cost estimate reviews also include a benchmarking analysis. These processes have been shared with the AUC and the TFCMC.

7 According to Section 10 of Ministerial Order 64/2010, the mandate of the TFCMC is to review all Transmission Facility Projects forecast to cost in excess of $100 million. In a letter dated January 12, 2011, the Minister of Energy clarified that the starting point for the TFCMC when reviewing cost variances is the estimate in place when a project is approved by an Order in Council for Critical Transmission Infrastructure (CTI) projects, or, the estimate in place when the Needs Identification Document (NID) is approved by the Alberta Utilities Commission (AUC). The AESO, of course, is at liberty to file benchmarking cost reports with various stakeholders, including the AUC, in respect of projects below the $100-million threshold.

Cost Accountability Recommendation: Status of ISO Rule 9.1 – Transition to Rule 504.5 Series

ISO Rule 504.5 (Service Proposals and Cost Estimating) became effective April 29, 2016.

As a result, AESO practices have been revised to address the changes as per the new rule. In addition, the AESO plans to post a revised cost estimating template on its website in October 2016. The new cost estimating template will be a consolidated template, which will be used for capturing all cost estimates, for capturing changes to cost estimates due to project change proposals and for the reporting of detailed final costs.

The AESO is currently planning activities to review and revise all remaining 9.1 ISO Rules.

Transmission Cost Accountability Recommendation: Reporting and Oversight Protocol

The AUC's Approved Cost Estimate (ACE) process – arising out of new transmission cost management legislation approved by the Government of Alberta in September 2014 – is pending receipt of information on process, timing and next steps from the AUC.

Further, a decision on the Cost Oversight Management (COM) recommendations are pending a decision from Alberta Energy.

Recommendations to the Provincial Government

The TFCMC has directed two recommendations to Alberta Energy through its semi-annual reports. One[8] of the two, **Recommendation Number 5 in the June 2011 Report**, was considered premature by the Department given the implementation of the other recommendations from the same semi-annual report.

The TFCMC made a second recommendation for the Department to consider. This one, **Recommendation Number 1 in the December 2011 Report**, reads as follows:

- That the Minister of Energy modify the Transmission Regulation to require TFOs to seek AESO authorization of CTI pre-construction expenditures incurred prior to AUC approval of the Facility Application.

The Minister, in a letter to the Committee, advised that Alberta Energy would consider this recommendation as it reviews potential amendments to the Transmission Regulation, and Alberta Energy has considered this recommendation as part of its review. Amendments to the Transmission Regulation were made in September 2014. Numerous regulatory changes were put into effect on September 22, 2014, including the elimination of Critical Transmission Infrastructure (CTI) provisions for projects starting after September 22, 2014.

8 The recommendation reads: That for non Critical Transmission Infrastructure (CTI) projects, the Department of Energy consider legislative changes to require a second approval stage by the AUC if cost estimates exceed a pre-determined limit. The TFCMC recognizes the need to avoid unnecessary project delays due to factors outside the control of the TFOs.

New Recommendations

The Committee has two new recommendations, both directed towards the Government of Alberta.

1. The TFCMC recommends that Alberta Energy expeditiously take action on the proposals from the Cost Oversight Management (COM) Subgroup.

   A pilot project to explore the potential value of the COM initiative was completed more than 12 months ago. According to the information publicly available, all members of the COM Subgroup, except the AESO, recommended that the pilot be extended for new pre-NID projects expected to receive a regulatory decision on their NID applications within two years. This two-year extension of the pilot program would allow an assessment of whether the COM function results in an improvement in the efficiency of regulatory proceedings. The AESO indicated that they are opposed to the institutionalization of the COM function, but did not oppose an extension of the pilot project.

   The Committee supports this policy initiative because it could improve cost management of electricity transmission projects in Alberta, thereby protecting consumers from unnecessary increases in their energy costs. The province's Climate Leadership Plan (CLP) could trigger new transmission development projects. Expeditious actions to move forward with the COM initiative would help to establish a more robust cost management structure for electricity transmission projects before any new projects are undertaken.

2. In regards to the implementation of the Climate Leadership Plan (CLP), the TFCMC recommends that:

   - The coal retirement plan and any policy decisions related to replacement natural gas-fired generation consider the impact on the cost of transmission and attempt to utilize the existing transmission system as much as possible.

     For example, the concept of using brownfield sites for new natural gas-fired generation warrants full consideration. Policy decisions need to encourage new generators be located close to existing transmission capacity, in order to protect consumers by minimizing the overall cost impact of the CLP. It would make sense to use existing surplus transmission capacity before causing new transmission facilities to be built.

   - Locational criteria be included in the renewables procurement process.

   The CLP's objective is that renewable generating capacity will provide 30% of Alberta's electricity by 2030. In its report, the Climate Change Advisory Panel recommended a competitive procurement process, whereby successful bidders for government contracts would be provided with renewable credits. The contracts would be awarded to projects requiring the lowest renewable credits, in order to protect electricity consumers from unnecessary rate increases. The TFCMC submits that considering transmission costs in this process will protect consumers by minimizing the overall cost impact of the CLP.

Appendix A: About The TFCMC

Origin And Composition Of The Transmission Facilities Cost Monitoring Committee

The Government of Alberta created the Transmission Facilities Cost Monitoring Committee (TFCMC) on July 31, 2010 through a Ministerial Order issued by the Honourable Ronald Liepert, then Minister of Energy, in order to ensure Albertans have the benefit of increased transparency on the cost of transmission projects.

According to the Ministerial Order, number 64/2010, the TFCMC can consist of up to 13 individuals as follows:

- the **Alberta Association of Municipal Districts and Counties** may appoint one member;
- the **Alberta Chambers of Commerce** may appoint one member;
- the **Alberta Direct Connect Consumers Association** may appoint one member;
- the **Alberta Federation of Rural Electrification Associations** may appoint one member;
- the **Alberta Urban Municipalities Association** may appoint one member;
- the **Consumers' Coalition of Alberta** may appoint one member;
- the **Canadian Federation of Independent Business** may appoint one member;
- the **Industrial Power Consumers Association of Alberta** may appoint one member;
- the **Independent Power Producers Society of Alberta** may appoint one member;
- the Minister may also appoint up to two **independent members** with technical, regulatory, transmission facility development or other experience that, in the opinion of the Minister, will benefit the Committee;
- the **Independent System Operator** ("Alberta Electric System Operator") shall appoint one member; and
- the **Office of the Utilities Consumer Advocate** shall appoint one member.

The TFCMC's Mandate

The TFCMC's mandate is to review records that relate to the cost, scope, schedule and variances of Alberta transmission facility projects forecast to cost in excess of $100 million. This may include more than one transmission facility, if it is a part of a contiguous transmission facility project. The Alberta Electric System Operator (AESO), a not-for-profit entity that is responsible for the safe, reliable and economic planning and operation of Alberta's transmission system (also known as the Alberta Interconnected Electric System) determines which transmission facilities are part of a transmission facility project.

In a letter dated January 12, 2011, the Minister of Energy clarified that the starting point for the TFCMC – when reviewing cost variances – is the estimate in place when a project is approved by an Order in Council for Critical Transmission Infrastructure (CTI) projects, or, the estimate in place when the Needs Identification Document (NID) is approved by the Alberta Utilities Commission (AUC). The TFCMC, therefore, does not review any of the projects from an initial prudence, need, technology choice or staging perspective.

The TFCMC cannot delay or slow the development of transmission facility projects.

In late June 2011, the Minister of Energy provided his support of a request from the TFCMC to explore and develop innovative approaches to cost recovery for new transmission facilities in Alberta. The TFCMC was asked to undertake this initiative on a priority basis, together with the Transmission Facility Owners (TFOs), the AESO and Alberta Energy. The findings of this initiative were submitted in April 2012 to the Assistant Deputy Minister, Electricity, Alternative Energy and Carbon Capture and Storage, for consideration and action.

The TFCMC's Members

The organizations and independent members named in the Ministerial Order forming the TFCMC represent a cross-section of industry, consumer and business groups with ties to Alberta's electricity sector.

Organizations and independent members are listed alphabetically:

Alberta Association of Municipal Districts and Counties (AAMDC)

The AAMDC advocates on behalf of the province's 69 municipal districts and counties. The association assists its members in achieving strong, effective local government. Their representative on the TFCMC is **Dwight Oliver, a Past Director for AAMDC District 2.**

Alberta Chambers of Commerce (ACC)

The ACC is a federation of 125 Chambers of Commerce, which in turn represents 24,000 businesses. The ACC ensures its members' business interests are improved through the development and advocacy of policy to the provincial and federal governments. Their representative on the TFCMC is **Ken Kobly, ACC President & CEO.**

Alberta Direct Connect Consumers Association (ADC)

The ADC represents nine large industrial consumers who have facilities directly connected to the transmission system. The ADC members represent the key sectors of forestry, chemical and cement manufacturing. The aggregate electricity demand of the membership represents about 7% of the Alberta load. Their representative on the TFCMC is **Colette Chekerda, ADC Executive Director.**

Alberta Electric System Operator (AESO)

The AESO is a not-for-profit entity, is independent of any industry affiliations, and owns no transmission or market assets. It is responsible for the safe, reliable and economic planning and operation of the Alberta Interconnected Electric System. Their representative on the TFCMC is **Kelly Yagelniski, AESO's Director, Transmission Program Support.**

Alberta Federation of Rural Electrification Associations (AFREA)

The AFREA is a not-for-profit cooperative association representing member Rural Electrification Associations (REAs) who provide rural power services throughout Alberta. It is committed to promoting the economic welfare and value of its cooperative members by providing strong representation to government and industry stakeholders with one voice. Their representative on the TFCMC is **Dan Astner, Representative District 3 on the AFREA Board as District Director for member REAs: Battle River.**

Alberta Urban Municipalities Association (AUMA)

The AUMA represents urban municipalities including cities, towns, villages, summer villages and specialized municipalities, and more than 85% of Albertans. It represents and advocates for the interests of its members to the provincial and federal governments. Their representative on the TFCMC is **Andre Chabot, AUMA Director, Cities Over 500,000.**

Consumers' Coalition of Alberta (CCA)

The CCA is comprised of the Consumers' Association of Canada (Alberta Division) and the Alberta Council on Aging. The CCA, a coalition of two public interest groups, participates as a collective in public utility hearings to ensure rates, tolls and charges for residential customers are just and reasonable. Their representative on the TFCMC is **Azad Merani, CCA Consultant.**

Independent Power Producers Society of Alberta (IPPSA)

The IPPSA represents Alberta's power producers. IPPSA is a forum for dialogue among Alberta's power producers and a proponent of competition in Alberta's electricity market. Their representative on the TFCMC is **Evan Bahry, IPPSA's Executive Director.**

Industrial Power Consumers Association of Alberta (IPCAA)

The IPCAA is an organization representing large industrial customers, including such key sectors as oil & gas, forest products, petrochemicals and steel. Its mission is to take a leadership role in achieving a fair, open and efficient marketplace for electricity sales and service in Alberta. Their representative on the TFCMC is **Vittoria Bellissimo, IPCAA's Executive Director.**

Office of the Utilities Consumer Advocate (UCA)

The UCA is the voice of small consumers in Alberta's electricity and gas markets. The UCA advocates on behalf of Alberta's low-volume or smaller users of electricity and natural gas, those being residential, small business and farm utilities consumers, and helps them to make informed choices. As well, the UCA represents and protects their interests by participating in utility hearings and inquiries. The UCA representative on the TFCMC is **Wayne Taylor.**

TFCMC Independent Members:

Allen Snyder, of Winnipeg, brings a background and a wealth of knowledge in the electricity sector to the TFCMC. He held several key executive positions with Manitoba Hydro including Vice President of Transmission & Distribution, Power Supply and Corporate Services over the past 20 years. He also established the very successful Manitoba Hydro International with sales of software and services to more than 60 countries worldwide. Currently, he is Vice President of Energy Services for Wood West & Associates.

Henry Yip is a senior business executive with more than 30 years of broad business experience in Canada and the USA. He has held senior executive positions in large corporations and entrepreneurial business enterprises, and has advised governments in the area of city planning, strategy development, technology commercialization, international business collaboration and grant application approval. His current business interests include Executive Chair at Nirix Technology, and President of C'andcee Development. He is a past Chair of the Board at Edmonton Economic Development Corporation.

Former Members

Canadian Federation of Independent Business (CFIB)

The CFIB is an association representing small- and medium-sized businesses across Canada that takes direction from its more than 109,000 members, providing independent businesses a voice at all levels of government. The CFIB resigned in early 2014, stating it believes its involvement is no longer necessary due to the re-establishment of an independent regulatory review process and the repeal of Bill 50.

The Operations Of The TFCMC

In January 2016, due to a reduced project activity environment, the TFCMC began a six-month trial of holding its meetings every second month as opposed to meeting every month. However, project status reports will continue to be provided to the Committee every month.

Since the fall of 2015, the Committee moved to a videoconference model for its meetings. Utilizing video conferencing facilities made available by Alberta Energy in the cities of Edmonton and Calgary, Committee members can choose to attend in either location that would allow them to minimize time and costs. The primary purpose of the meetings is to review reports provided by AESO on the cost status of transmission projects that are within the Committee's purview. The first meeting took place in September 2010.

The TFCMC reviews the reasons for cost variances of all these projects. When appropriate, it retains external experts to prepare information requests (IRs) for the AESO and the Transmission Facility Owners (TFOs) for further illumination on the reasons for the variances.

Each calendar year, the TFCMC is required to provide at least two reports to the member organizations represented on the committee as well as at least one report to the Ministers of Energy and Service Alberta. The reports summarize the records it reviews and the status of the transmission facility projects.

The TFCMC strives for consensus in its decision-making process but a simple majority of those present at a meeting is the minimum threshold for agreement.

Independent member Henry Yip chairs the TFCMC. The TFCMC secretary is Laura Severs, engaged through Alberta Energy; she also serves as the Committee's technical writer.

The TFCMC will also form subcommittees from time to time to facilitate the workings of the Committee. There were two active subcommittees in operation during the period of this report:

- A standing subcommittee to monitor and approve expenditures incurred by the members of the TFCMC during the course of discharging its mandate.
- The Information Request (IR) subcommittee. This group develops appropriate questions for the TFOs in order to get clarification on information previously provided by the TFOs on the cost status of the various transmission projects. This subcommittee is supported by external expert advisors when required.

Appendix B: The Transmission Projects At A Glance

Facility Applications for each project are sorted by the forecast or actual in-service date (ISD). The Facility Application number column in each project's initial chart is provided as an easy reference to its location on the accompanying map. Please note that due to updated information, some costs, dates and items may have changed from previous TFCMC reports and as such please use this latest material going forward.

1. **CENTRAL EAST AREA TRANSMISSION DEVELOPMENT (CETD);** PROJECT 811 – Transmission development in Wainwright, Lloydminster, Provost, Vegreville and Cold Lake.

THE PROJECT: To accommodate load and generation in central Alberta, additional substations and upgrades to existing facilities are required. The Central East project serves the dual purpose of meeting the growing demand for electricity for pipelines moving oilsands production, and the connection of more than 500 MW of proposed gas-fired generation and wind farms in the eastern region of Central Alberta. Aging infrastructure, overloads, and low voltages in the large area east of Edmonton, from Cold Lake in the Northeast region to Hardisty, compels the substantial rebuild of the 138 kV and 144 kV systems, and the decommissioning of aging 69 kV and 72 kV lines. The Alberta Electric System Operator (AESO) originally outlined the need for the 138/144 kV augmentation and upgrade, with two stages of implementation.

THE COMPONENTS: As noted, there were two stages to this project, however, Stage 2 has been cancelled and the current Needs Identification Document (NID) is being amended to address the cancellations. Additionally, a new project is being developed to address system constraints.

The major components for Stage 1 of the project are: a new 144/25 kV Watt Lake substation; the conversion of three existing 72/25 kV substations to 144/25 kV; a new 240 kV switching station in the Cold Lake area, energized at 144 kV initially; a new double-circuit 144 kV line from the existing Mahihkan 837S to the new switching station; a new 240 kV double-circuit line (one-side strung) from the new switching station to the existing Bonnyville 700S and initially energized at 144 kV; a new single-circuit line from the existing Wainwright 51S to the existing Edgerton 899S; a new 144 kV capacitor bank at Vermilion 710S; the addition of one 138/72 kV transformer at the existing Wainwright 51S; rebuild six existing 138 kV or 144 kV lines to increase capacity, and restore ratings of existing 144 kV lines by mitigating line clearances and discontinuing the use of existing 72 kV equipment at existing substations or lines.

FACILITY APPLICATION NAME	FACILITY APPLICATION NUMBER	FACILITY APPLICATION DESCRIPTION	FORECAST OR ACTUAL IN-SERVICE DATE
Line Clearance Mitigation	10	Restore ratings of existing 144 kV lines by mitigating line clearances	July 18, 2012
Heisler Area Upgrades	7	Convert Heisler 764S from 72 kV to 144 kV; addition of 144/72/25 kV transformer from Vermilion 710S; new 144 kV single-circuit line from Heisler 764S to existing 7L701 and discontinue use of existing 6L05	July 27, 2013
Vermilion 710S Substation Upgrade	6	Addition of 144 kV–25 VAr capacitor bank; addition of a new 144/25 kV transformer; relocation of existing 144/72/25 kV transformer to Heisler 764S; discontinue use of existing 72 kV equipment at Vermilion 710S and discontinue use of 6L06 (Kitscoty 705S to Vermilion 710S)	September 15, 2013
St. Paul Area Upgrades – Watt Lake, 7LA92	3	New 144/25 kV Watt Lake and new 144 kV line from Watt Lake to existing 7LA92	December 12, 2013

FACILITY APPLICATION NAME	FACILITY APPLICATION NUMBER	FACILITY APPLICATION DESCRIPTION	FORECAST OR ACTUAL IN-SERVICE DATE
Cold Lake Area Reinforcements (Except Bonnyville to Bourque)	1	New 144 kV switching station (Bourque 970S); new 144 kV double-circuit line from existing Mahihkan 837S to new 144 kV switching station and rebuild existing 144 kV lines (7L87, 7L74 and 7L83)	January 30, 2014
St. Paul Area Upgrades – Whitby Lake	5	Rebuild St. Paul 707S from 72/25 kV to 144/25 kV substation; new 144 kV double-circuit line from St. Paul 707S to existing 7L70 creating an in/out configuration	June 25, 2014
Kitscoty Area Upgrades	8	Convert Kitscoty 705S from 72 kV to 144 kV; addition of 144/72/25 kV transformer from Heisler 764S, new 144 kV double-circuit line from Kitscoty 705S to existing 7L14	December 4, 2014
St. Paul Area Upgrades	4	St. Paul 707S and 7L139/7L70 in/out	June 21, 2016
Cold Lake Area Reinforcements – Bonnyville	2	New 240 kV double-circuit line (one-side strung) from new 144 kV switching station to existing Bonnyville 700S, initially energized at 144 kV	February 1, 2017
Line Clearance Mitigations	11,12	Restore ratings of existing 144 kV lines by mitigating line clearances	CANCELLED
Wainwright Upgrades	13	25 km of single-circuit line from Wainwright 51S to 704L	CANCELLED

THE TRANSMISSION FACILITY OWNER(S): AltaLink Management Ltd. (AltaLink) and ATCO Electric Ltd. (ATCO).

PROJECT COST:

TRANSMISSION PROJECT	AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST	CURRENT ESTIMATED COST
Central East Area Transmission Development	**$246 Million** (2013$)	**$344 Million** (ISD$ with escalation for Stage 1)

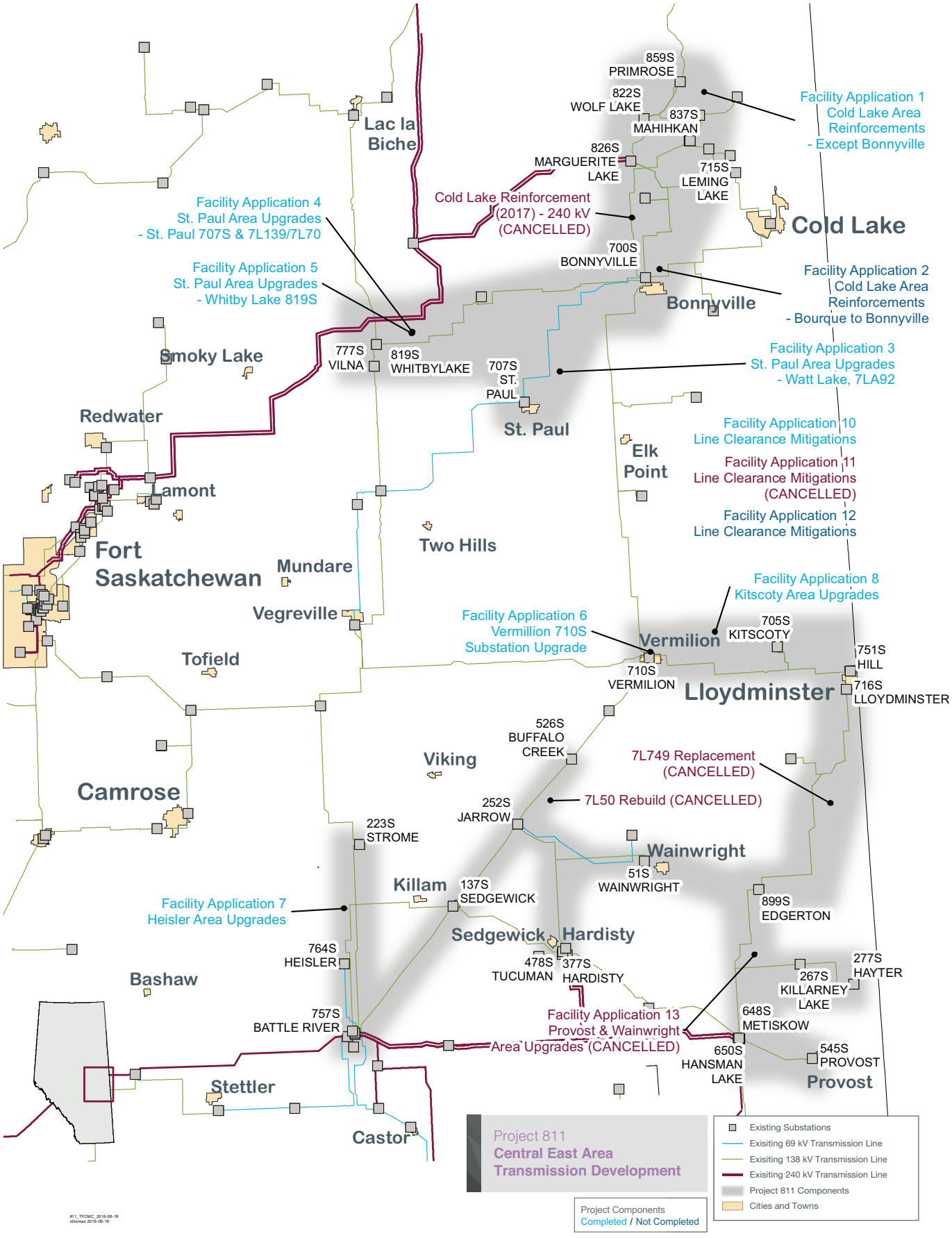
CURRENT STATUS: One facility remains under construction and is expected to be in service in February 2017.

The AESO identified 12 project components from the NID approval that are no longer needed or have been rendered inappropriate by changing needs in the Central East sub-region.

A new application for the Central Region will address transmission requirements in the region.

PROJECT RISKS

Implementation of the projects identified in the 2015 AESO Long-Term Plan (LTP) for the Central Region will address and remove current and future congestion in the region. Delays may cause additional concerns on the grid.


859S
PRIMROSE
822S
WOLF LAKE
837S
MAHIHKAN
826S
MARGUERITE
LAKE
715S
LEMING
LAKE
Facility Application 1
Cold Lake Area
Reinforcements
- Except Bonnyville
Cold Lake Reinforcement
(2017) - 240 kV
(CANCELLED)
Cold Lake
700S
BONNYVILLE
Facility Application 4
St. Paul Area Upgrades
- St. Paul 707S & 7L139/7L70
Facility Application 5
St. Paul Area Upgrades
- Whitby Lake 819S
Facility Application 2
Cold Lake Area
Reinforcements
- Bourque to Bonnyville
Bonnyville
Lac la
Biche
Smoky Lake
777S
VILNA
819S
WHITBYLAKE
707S
ST.
PAUL
Facility Application 3
St. Paul Area Upgrades
- Watt Lake, 7LA92
St. Paul
Redwater
Facility Application 10
Line Clearance Mitigations
Facility Application 11
Line Clearance Mitigations
(CANCELLED)
Facility Application 12
Line Clearance Mitigations
Elk
Point
Lamont
Two Hills
Fort
Saskatchewan
Mundare
Facility Application 8
Kitscoty Area Upgrades
Vegreville
Facility Application 6
Vermillion 710S
Substation Upgrade
705S
KITSCOTY
Vermilion
751S
HILL
710S
VERMILION
716S
LLOYDMINSTER
Lloydminster
Tofield
526S
BUFFALO
CREEK
Viking
7L749 Replacement
(CANCELLED)
Camrose
252S
JARROW
7L50 Rebuild (CANCELLED)
223S
STROME
Wainwright
51S
WAINWRIGHT
Killam
137S
SEDGEWICK
899S
EDGERTON
Facility Application 7
Heisler Area Upgrades
Sedgewick
Hardisty
764S
HEISLER
478S
TUCUMAN
377S
HARDISTY
277S
HAYTER
267S
KILLARNEY
LAKE
Bashaw
757S
BATTLE RIVER
Facility Application 13
Provost & Wainwright
Area Upgrades (CANCELLED)
648S
METISKOW
650S
HANSMAN
LAKE
545S
PROVOST
Provost
Stettler
Castor
Project 811
Central East Area
Transmission Development
Project Components
Completed / Not Completed
Existing Substations
Exisiting 69 kV Transmission Line
Exisiting 138 kV Transmission Line
Exisiting 240 kV Transmission Line
Project 811 Components
Cities and Towns

2. **EDMONTON REGION 240 KV LINE UPGRADES (ERLU);** PROJECT 786 – Upgrading 240 kV lines in the Edmonton area and adding one 240 kV phase shifter at the Livock substation to gain more capacity out of the existing 240 kV network.

   THE PROJECT: More than 4000 MW of baseload generation that serves as the main source of electricity for the majority of the province is situated near Wabamun Lake in the Edmonton region. This generation supports central and south Alberta loads, northwest regional loads, Edmonton-area loads and major industrial loads located in the Fort Saskatchewan area. There are major thermal overloads of transmission facilities throughout the Edmonton region. The 138 kV transmission paths from Wabamun to North Calder and East Edmonton to Nisku, and from East Edmonton to the Fort Saskatchewan area are weak during peak load conditions, and voltage violations occur in those two areas due to weak system support.

   THE COMPONENTS: The 240 kV transmission system developments in the area include a rebuild of some sections of the existing transmission line, an increase in capacity of the lines by replacing conductors, the reconfiguration of the system, building new lines and the installation of a special protection scheme for multiple contingencies to ensure system reliability in the area. Additionally, a 240 kV phase-shifter transformer will be installed at Livock 939S in the Fort McMurray area.

FACILITY APPLICATION NAME	FACILITY APPLICATION NUMBER	FACILITY APPLICATION DESCRIPTION	FORECAST OR ACTUAL IN-SERVICE DATE
AltaLink Keephills Substation addition	1	Additions at Keephills	July 31, 2010
AltaLink1045L, 909L Restring	5	Restring four km of 908L and 909L outside Sundance 310P substation (first four km of the lines); 908L is renumbered to 1045L	March 20, 2011
EPCOR Jasper, Petrolia	6	Upgrade bus work and protections	June 14, 2011
EPCOR 1044EL, 1045EL	3	Restring approximately 24 km of existing 904L at Jasper 805S – in/out line section; renumber EPCOR's portion of the line to 1044EL (going to Petrolia 816S) and 1045EL (going to Sundance 310P)	February 29, 2012
ATCO Phase Shifter	7	Add 600 MVA phase shifting transformer at Livock 939S	August 20, 2013
TransAlta 902L	8	Rebuild portion of 902L	November 12, 2014
AltaLink Rebuild 240 kV 904L (1043L) TransAlta 902L, Re-terminate 909L at Sundance	2 and 4	Delegate the work to AltaLink for re-termination of the existing 240 kV 909L at Sundance 310P (Ellerslie 89S to Sundance 310P); rebuild approximately 50 km of the existing 240 kV line 904L between Jackfish Lake west of Edmonton and Petrolia 816S; salvage the existing 240 kV structures, conductor and hardware; build a new section of approximately 12 km of 240 kV line utilizing double-circuit structures with one-side strung to connect Keephills 320P substation to the rebuild of 904L – renumbered to 1043L (Keephills 320P to Petrolia 816S)	November 30, 2016

THE TRANSMISSION FACILITY OWNER(S): AltaLink, EPCOR Distribution and Transmission Inc. (EDTI) and ATCO.

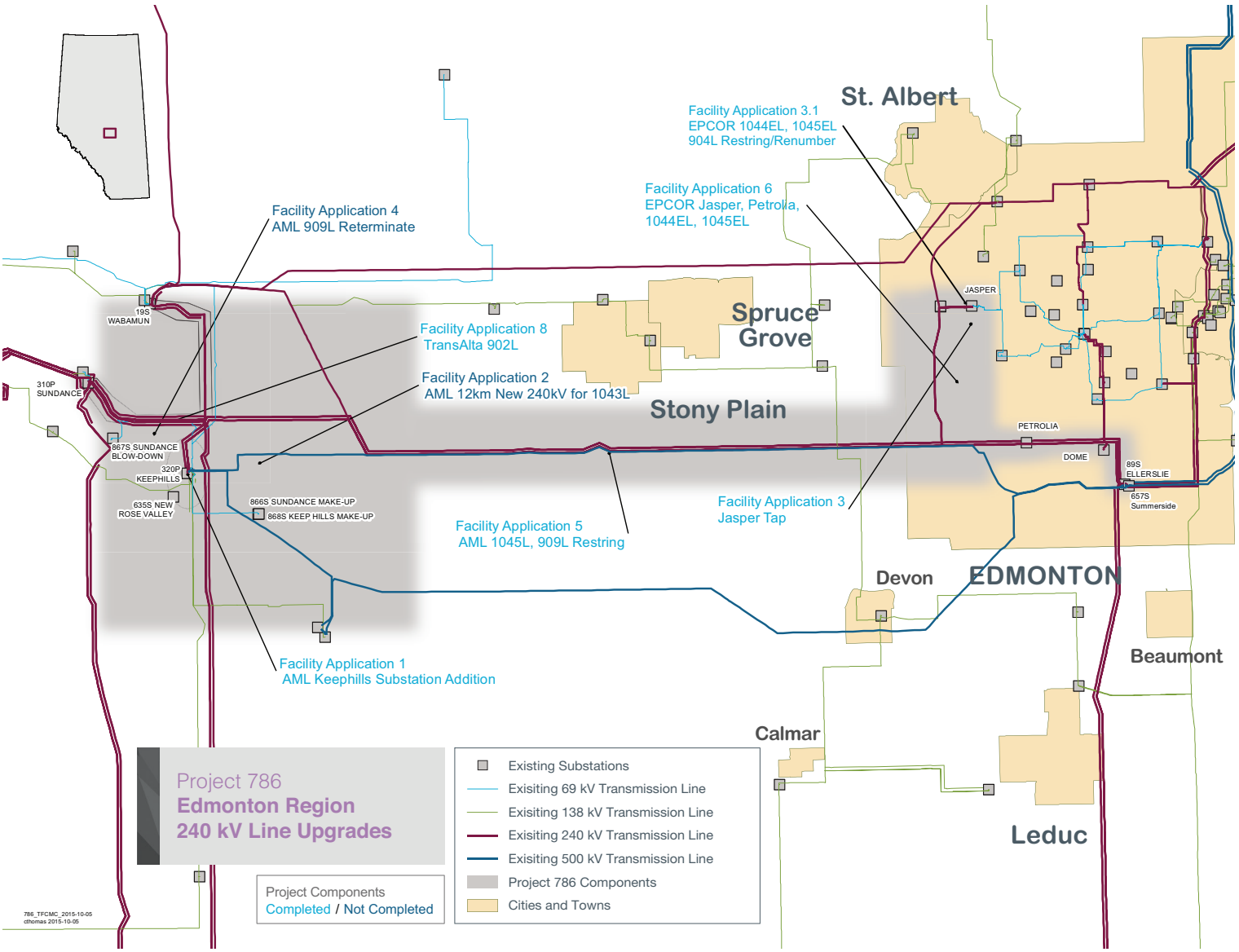
PROJECT COST:

TRANSMISSION PROJECT	AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST	CURRENT ESTIMATED COST
Edmonton Region 240 kV Line Upgrades	**$182 Million** (2013$)	**$178 Million** (ISD$ with escalation)

CURRENT STATUS: The remaining construction requires completion of the 1043L transmission line and the re-termination of 909L. TransAlta and the Enoch First Nations have reached an access agreement, and AltaLink is scheduled to complete this work by November 30, 2016.

PROJECT RISKS

There are no risks to report at this time.


St. Albert
Facility Application 3.1
EPCOR 1044EL, 1045EL
904L Restring/Renumber
Facility Application 6
EPCOR Jasper, Petrolia,
1044EL, 1045EL
Facility Application 4
AML 909L Reterminate
JASPER
19S
WABAMUN
Facility Application 8
TransAlta 902L
Spruce
Grove
310P
SUNDANCE
Facility Application 2
AML 12km New 240kV for 1043L
Stony Plain
PETROLIA
867S SUNDANCE
BLOW-DOWN
320P
KEEPHILLS
DOME
89S
ELLERSLIE
657S
Summerside
635S NEW
ROSE VALLEY
866S SUNDANCE MAKE-UP
868S KEEP HILLS MAKE-UP
Facility Application 3
Jasper Tap
Facility Application 5
AML 1045L, 909L Restring
Devon
EDMONTON
Beaumont
Facility Application 1
AML Keephills Substation Addition
Calmar
Leduc
Project 786
Edmonton Region
240 kV Line Upgrades
Project Components
Completed / Not Completed
Existing Substations
Exisiting 69 kV Transmission Line
Exisiting 138 kV Transmission Line
Exisiting 240 kV Transmission Line
Exisiting 500 kV Transmission Line
Project 786 Components
Cities and Towns
786_TFCMC_2015-10-05
cthomas 2015-10-05

3. **FORT MCMURRAY WEST AREA 500 KV TRANSMISSION BULK SYSTEM REINFORCEMENT (FMACW);** PROJECT 1590 (Formerly Project 838) – Construction of a West 500 kV transmission line from the Edmonton area to the Fort McMurray area.

THE PROJECT[9]: The Fort McMurray West Area transmission project is to serve load from the expected growth of the oilsands industry in the northeastern part of the province.

THE COMPONENTS: The major components for Stage 1 of the project (West 500 kV Line) are approximately 500 km of 500 kV single-circuit transmission line from Thickwood Hills 951S to Sunnybrook 510S; a 500 kV substation switchyard at Thickwood Hills 951S to terminate the north end of the West 500 kV line; modifications to the Sunnybrook 510S substation to terminate the south end of the West 500 kV line, and a 500/240 kV 1200 MVA transformer bank at Thickwood Hills 951S.

FACILITY APPLICATION NAME	FACILITY APPLICATION NUMBER	FACILITY APPLICATION DESCRIPTION	FORECAST OR ACTUAL IN-SERVICE DATE
Fort McMurray Area Bulk System Development Stage 1 – West Line	1	One 500 kV transmission line will be constructed from a new substation at Thickwood Hills to the Genesee area, referred to as the West 500 kV line	2019

THE TRANSMISSION FACILITY OWNER(S): Alberta PowerLine L.P. (APL).

PROJECT COST:

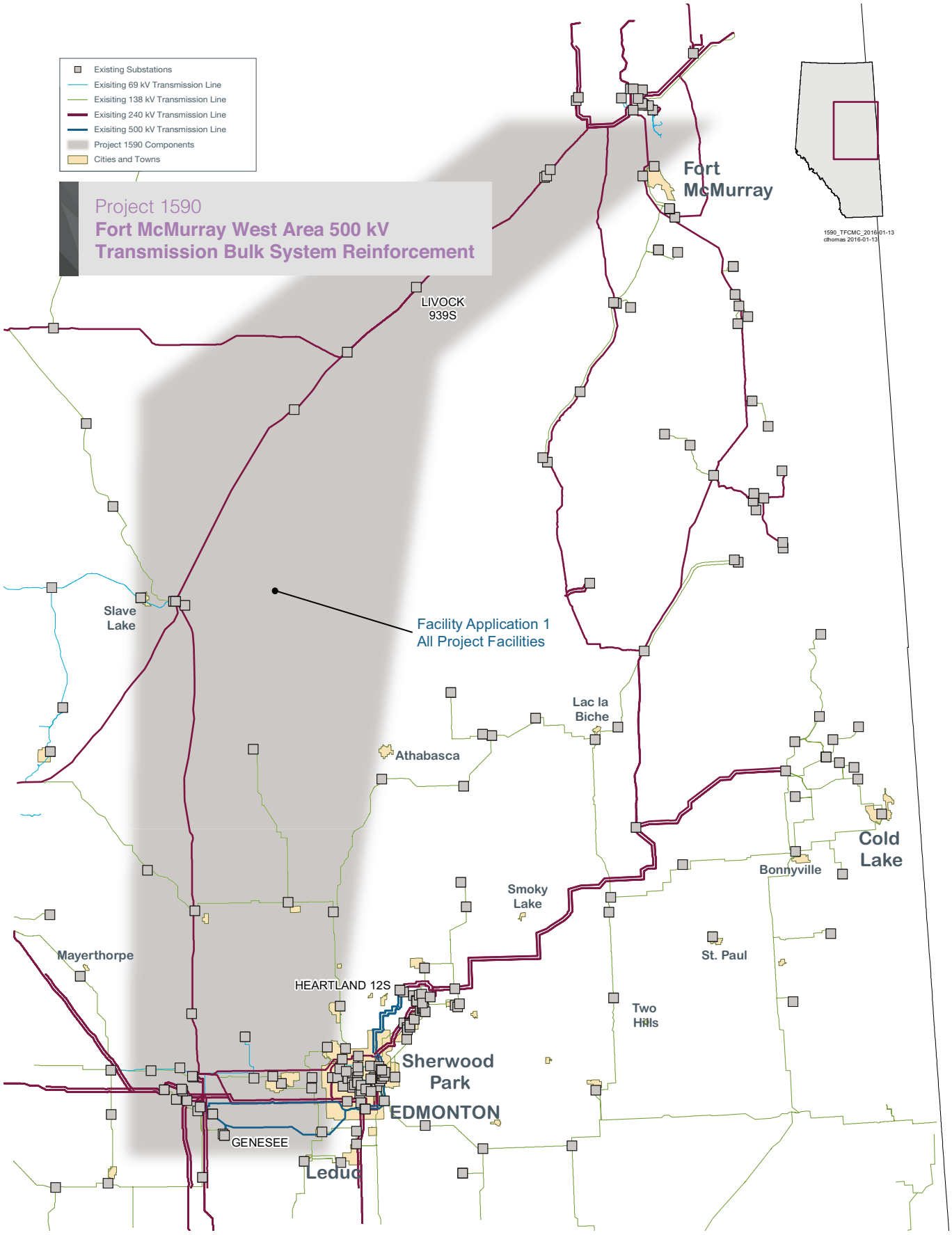
TRANSMISSION PROJECT	AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST	CURRENT ESTIMATED COST
Fort McMurray West Area 500 kV Transmission Bulk System Reinforcement	**Stage 1: $1.796 Billion** (2013$)	**Stage 1: $1.433 Billion**

CURRENT STATUS: As noted in the last TFCMC semi-annual report, APL filed its Facility Application (FA) with the Alberta Utilities Commission (AUC) on December 1, 2015 and it is currently waiting for approval. The target in-service date (ISD) for the project is June 1, 2019.

PROJECT RISKS

Delays in the connecting substation projects (1186-Thickwood Hills and 1655-Sunnybrook/Livock) may affect the ISD. A delay in the AUC's approval of the FAs, due to the delay in the hearings resulting from the major Fort McMurray fire, could also affect the ISD.

9 Prior to the December 2015 TFCMC semi-annual report, this project was referred to as Project 838, Fort McMurray Area Transmission Bulk System Reinforcement. which was to have seen the construction of two 500 kV transmission lines from the Edmonton area to the Fort McMurray area. However, the AESO deferred the launch of Stage 2, the East 500 kV Line, due to a slower economic environment and sustained low oil prices. The East 500 kV line would have been constructed from a new substation at Thickwood Hills to the Heartland area. Going forward, Project 838 has been renumbered and renamed and now only includes the West 500 kV Line. Further, 838 was the project number for both the West and East lines. Now that both projects are on separate deployment paths, the AESO needed to create different project numbers in order to separate them.


Existing Substations
Exisiting 69 kV Transmission Line
Exisiting 138 kV Transmission Line
Exisiting 240 kV Transmission Line
Exisiting 500 kV Transmission Line
Project 1590 Components
Cities and Towns
Project 1590
Fort McMurray West Area 500 kV
Transmission Bulk System Reinforcement
1590_TFCMC_2016-01-13
cthomas 2016-01-13
Fort McMurray
LIVOCK 939S
Facility Application 1
All Project Facilities
Slave Lake
Lac la Biche
Athabasca
Cold Lake
Bonnyville
Smoky Lake
St. Paul
Mayerthorpe
HEARTLAND 12S
Two Hills
Sherwood Park
EDMONTON
GENESEE
Leduc

4. **NORTHWEST (OF) FORT MCMURRAY TRANSMISSION DEVELOPMENT (NW FMM);** PROJECT 1180 – To provide service and connect future industrial customers in areas northwest of Fort McMurray where there are no transmission facilities.

THE PROJECT: The Northwest (of) Fort McMurray 240 kV Transmission Development includes a 240 kV looped system extending west from existing transmission facilities between the Dover 888S and Joslyn 849S substations, including the addition of two new 240 kV substations. This expansion of the transmission system will serve developing (electricity intensive) industrial growth as oilsands extraction facilities and related industrial developments are proceeding into areas where there are currently no transmission facilities to provide service, and connect future industrial customers.

THE COMPONENTS: Major components include a new 240 kV switching substation (Birchwood Creek 960S-NW FMM South); existing 9L57 line in/out at Birchwood Creek 960S; a new 240 kV switching station (Ells River 2079S-NW FMM North); 9L08 Joslyn to Dover line in/out at Ells River 2079S (approximately 50 km of 240 kV double-circuit line, designated as 9L08/9L76), and approximately 80 km of 240 kV single-circuit line (9L95), between Ells River 2079S and Birchwood Creek 960S.

FACILITY APPLICATION NAME	FACILITY APPLICATION NUMBER	FACILITY APPLICATION DESCRIPTION	FORECAST OR ACTUAL IN-SERVICE DATE
Birchwood Creek substation and 9L57 in/out	1	Birchwood Creek: new 240 kV switching substation; existing 9L57 line in/out at Birchwood Creek	April 1, 2015
Ells River substation, 9L76 and 9L08, in/out 240 kV double-circuit line from existing 9L08 to Ells River substation	2	9L08, Joslyn to Dover line in/out at Ells River (approximately 50 km of 240 kV double-circuit line)	April 30, 2018
Ells River to Birchwood Creek Line 9L95, 240 kV line between Ells River and Birchwood Creek	3	Approximately 80 km of 240 kV double-circuit line, one-side strung, between Ells River and Birchwood Creek	July 15, 2018

THE TRANSMISSION FACILITY OWNER(S): ATCO.

PROJECT COST:

TRANSMISSION PROJECT	AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST	CURRENT ESTIMATED COST
Northwest (of) Fort McMurray Transmission Development	**$343 Million** (2013$)[10]	**$235.1 Million** (ISD$ with escalation)

CURRENT STATUS: The Birchwood Creek switching substation and 9L57 240 kV in/out have been in service as of March 9, 2015. The FA for the Ells River substation and 9L76/9L08 240 kV in/out double circuit was to be filed in the second quarter of 2015, however, due to the timing of customer system access requests in the area the AESO has advised ATCO to stop work until the re-assessment of the area is complete.

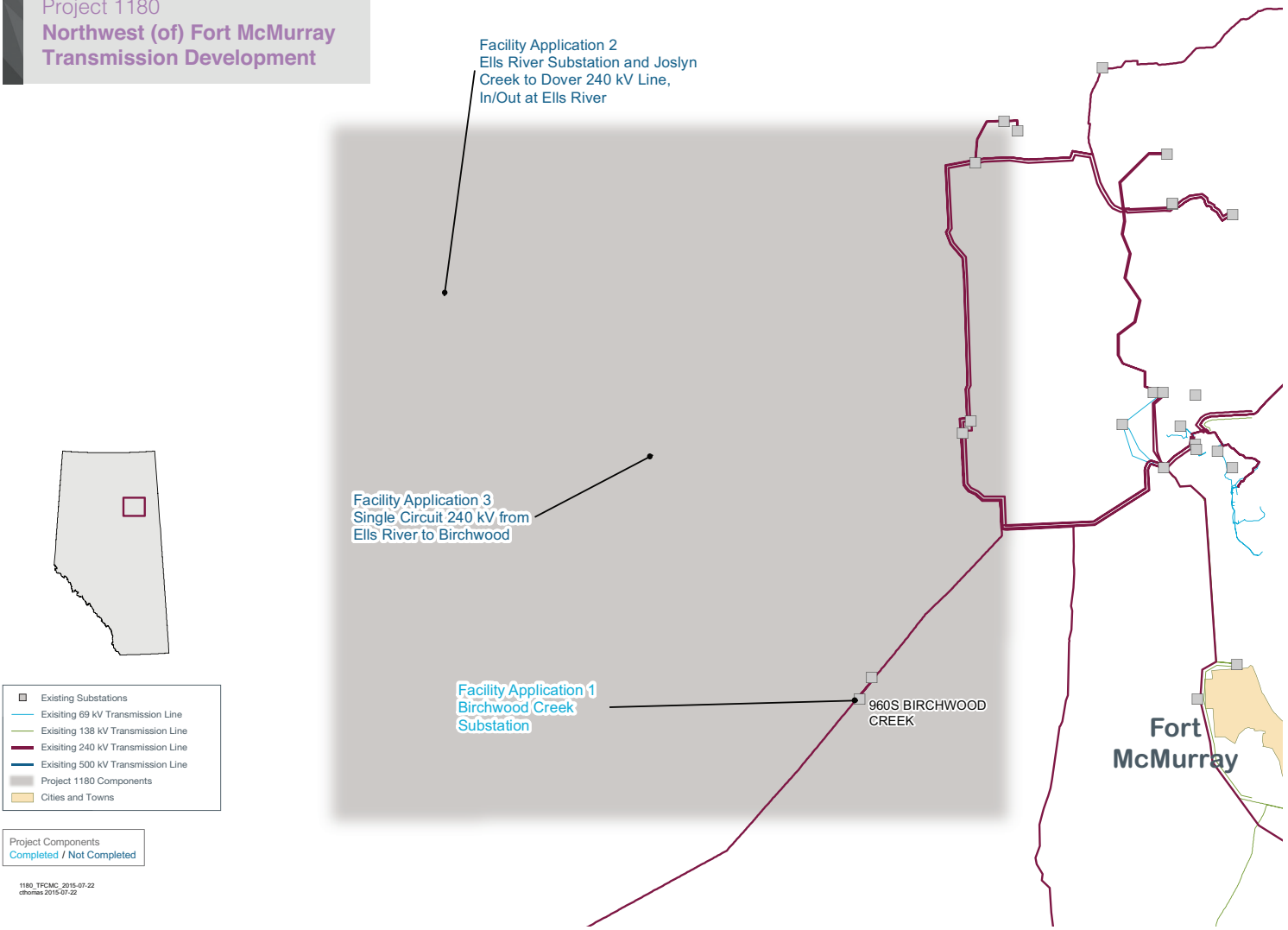
As such, the Ells River ISD has been delayed. Further delays and completion of the re-assessment may mean a re-scoping of the project and a NID Amendment.

10 Referenced as the "240 kV double-circuit line from Livock to Joslyn Creek" in the Long-Term Transmission Plan filed in June 2012.

PROJECT RISKS

As the remaining facilities of the project are on hold there are no risks to report at this time.

Project 1180
Northwest (of) Fort McMurray Transmission Development



5. **RED DEER REGION TRANSMISSION DEVELOPMENT (RDTD);** PROJECT 813 – 240/138 kV transmission system reinforcements in the Red Deer area.

THE PROJECT: Growing demand from industrial, commercial, farming, and residential, along with existing constraints on the system, have created the need to strengthen the transmission system in the Red Deer region.

THE COMPONENTS: There are two stages of transmission development for the project.

The major components for Stage 1 of the project are building new 240/138 kV substations near Didsbury, Ponoka and Innisfail; upgrading substations near Benalto and West Lacombe; adding approximately 150 km of new and rebuilt transmission line, and salvaging more than 100 km of existing transmission line.

The only component left for Stage 2 of the project is building a third 138 kV line from Gaetz to Joffre.

FACILITY APPLICATION NAME	FACILITY APPLICATION NUMBER	FACILITY APPLICATION DESCRIPTION	FORECAST OR ACTUAL IN-SERVICE DATE
Red Deer Area Transmission Development Stage 1 – Brownfields	1	Split 768L and 778L; 240/138 kV transformer at Benalto 17S; capacitor banks at Joffre 535S, Prentiss 276S and Ellis 332S	November 28, 2013
Red Deer Area Transmission Development Stage 1 – Rebuilds	2	Rebuild 80L from S. Red Deer 194S to N. Red Deer 217S; rebuild 80L from S. Red Deer 194S to Red Deer 63S; rebuild 755L from Red Deer 63S to Piper Creek 247S to Joffre 535S, and rebuild 717L from Red Deer 63S to Benalto 17S	February 1, 2017
Red Deer Area Transmission Development – New 423L	6	New 138 kV (423L) transmission line from 332S Ellis to 212S NE Lacombe	February 28, 2017
Red Deer Area Transmission Development Stage 1 – Greenfields	3	New Johnston 240/138 kV substation and new transmission lines; 138 kV line from NE Lacombe 212S to Ellis 322S; new Wolf Creek 240/138 kV substation and new transmission lines; new Hazelwood 240/138 kV substation and new transmission lines	March 30, 2017
Red Deer Area Transmission Development Stage I – Salvage	5	Salvage 80L from Ponoka 331S to West Lacombe 958S; salvage 80L from Red Deer 63S to Innisfail 214S to Olds 55S; salvage 716L from Wetaskiwin 40S to Ponoka 331S	April 13, 2017
Red Deer Area Transmission Development Stage 2 – Rebuild 166L	4	Rebuild 166L from Didsbury 152S to Harmattan 256S	ON HOLD
Red Deer Area Transmission Development Stage 2 – 2017 Facilities	7	Component energizations	ON HOLD

THE TRANSMISSION FACILITY OWNER(S): AltaLink.

PROJECT COST:

TRANSMISSION PROJECT	AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST	CURRENT ESTIMATED COST
Red Deer Region Transmission Development	**$329 Million** (2013$)	**$404.4 Million** (ISD$ with escalation)

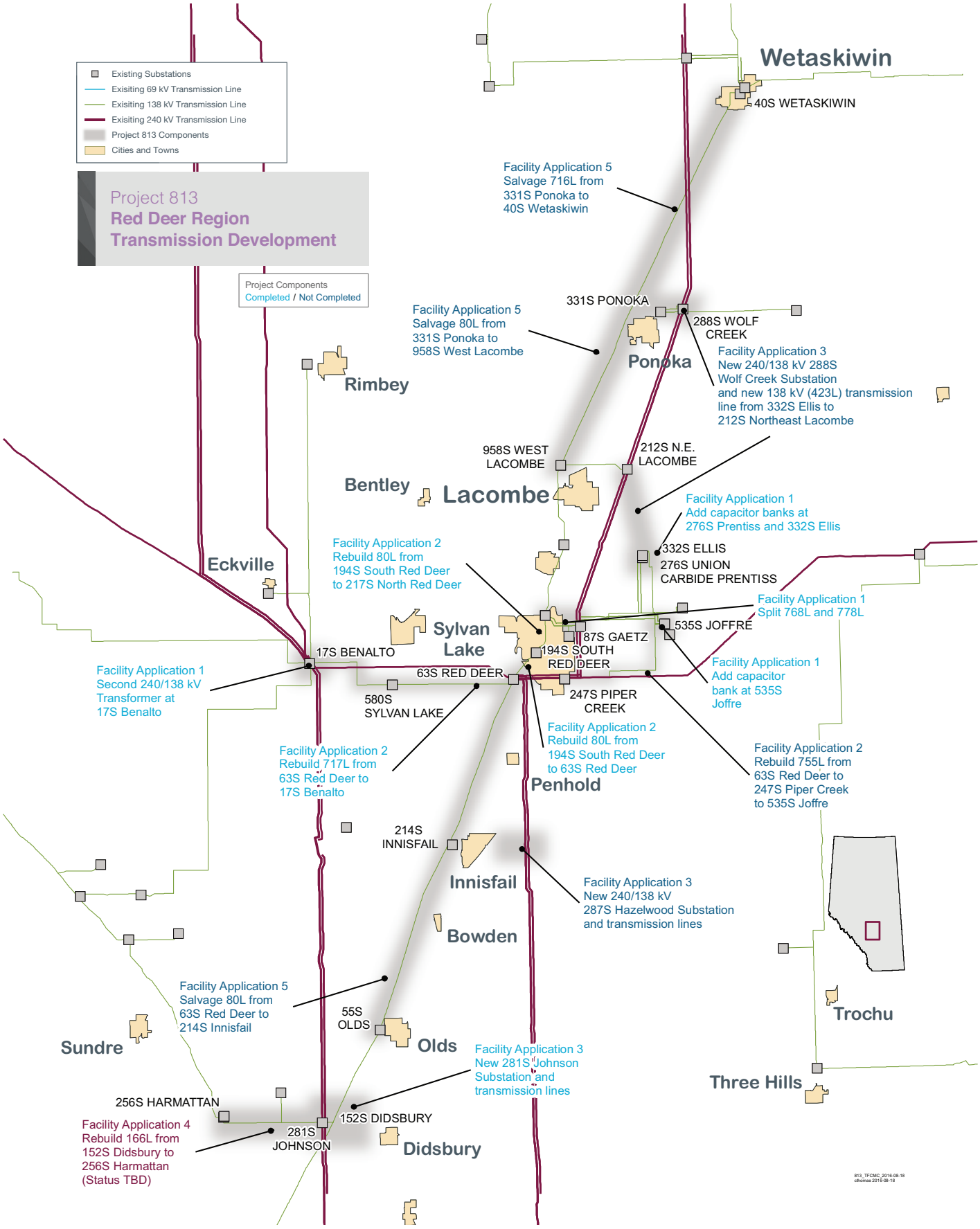
CURRENT STATUS: Stage 1 development includes FAs for brownfields, rebuilds and greenfields. The brownfields went in service in 2013, and the rebuilds and greenfields are expected to be in service by late 2016. The 423L AUC hearing resulted in a decision being made on November 27, 2015 to proceed with the 423L scope of work.

Stage 2 development is the rebuild of line 166L. Updated Central Region study results indicate that the line is not needed until 2030 or later. In November 2015, the AESO issued a Stop Work Direction to AltaLink to cease all work related to the rebuild of 166L.

Two FAs are under development with a forecast ISD of March 2017.

PROJECT RISKS

There are no risks at this time.


Existing Substations
Exisiting 69 kV Transmission Line
Exisiting 138 kV Transmission Line
Exisiting 240 kV Transmission Line
Project 813 Components
Cities and Towns
Project 813
Red Deer Region
Transmission Development
Project Components
Completed / Not Completed
Wetaskiwin
40S WETASKIWIN
Facility Application 5
Salvage 716L from
331S Ponoka to
40S Wetaskiwin
331S PONOKA
Facility Application 5
Salvage 80L from
331S Ponoka to
958S West Lacombe
288S WOLF
CREEK
Ponoka
Facility Application 3
New 240/138 kV 288S
Wolf Creek Substation
and new 138 kV (423L) transmission
line from 332S Ellis to
212S Northeast Lacombe
Rimbey
958S WEST
LACOMBE
212S N.E.
LACOMBE
Bentley
Lacombe
Facility Application 1
Add capacitor banks at
276S Prentiss and 332S Ellis
Facility Application 2
Rebuild 80L from
194S South Red Deer
to 217S North Red Deer
332S ELLIS
276S UNION
CARBIDE PRENTISS
Eckville
Facility Application 1
Split 768L and 778L
535S JOFFRE
Sylvan
Lake
87S GAETZ
17S BENALTO
194S SOUTH
RED DEER
63S RED DEER
Facility Application 1
Second 240/138 kV
Transformer at
17S Benalto
Facility Application 1
Add capacitor
bank at 535S
Joffre
580S
SYLVAN LAKE
247S PIPER
CREEK
Facility Application 2
Rebuild 80L from
194S South Red Deer
to 63S Red Deer
Facility Application 2
Rebuild 717L from
63S Red Deer to
17S Benalto
Facility Application 2
Rebuild 755L from
63S Red Deer to
247S Piper Creek
to 535S Joffre
Penhold
214S
INNISFAIL
Innisfail
Facility Application 3
New 240/138 kV
287S Hazelwood Substation
and transmission lines
Bowden
Facility Application 5
Salvage 80L from
63S Red Deer to
214S Innisfail
55S
OLDS
Trochu
Sundre
Olds
Facility Application 3
New 281S Johnson
Substation and
transmission lines
Three Hills
256S HARMATTAN
152S DIDSBURY
Facility Application 4
Rebuild 166L from
152S Didsbury to
256S Harmattan
(Status TBD)
281S
JOHNSON
Didsbury

6. **SOUTH AND WEST OF EDMONTON TRANSMISSION DEVELOPMENT (SWEATR);** PROJECT 850 – Transmission system reinforcement to the 138 kV systems south and west of the City of Edmonton.

THE PROJECT: In preparation of the South and West Edmonton Plan, the AESO considered the specific needs and timing of existing and future transmission facilities in the South and West Edmonton area. There is insufficient transmission capacity in the South and West Edmonton area and transmission reinforcements are required to provide the needed capacity to meet future load growth.

The South and West Edmonton Transmission Development will add two new 240/138 kV substations, one south of the town of Stony Plain and one close to the Nisku 149S substation; reconfigure the 138 kV network in the vicinity of the Cooking Lake 522S substation; rebuild portions of the 138 kV transmission lines, and modify existing substations in the area.

THE COMPONENTS: The list for the South and West of Edmonton Transmission System Development is as follows: a new 240/138 kV Harry Smith substation; a new 240/138 kV Saunders Lake substation; two new 138 kV lines between 780L and Cooking Lake, and reconfiguration; one 138 kV 27 MVAr capacitor bank at Leduc 325S; existing 138 kV lines reconfiguration.

FACILITY APPLICATION NAME	FACILITY APPLICATION NUMBER	FACILITY APPLICATION DESCRIPTION	FORECAST OR ACTUAL IN-SERVICE DATE
New capacitor bank at Leduc 325S	5	One 138 kV 27 MVAr capacitor bank at Leduc 325S	December 31, 2017
Open 133L from Wabamun 19s to 234L tap	4	Operate 133L line from Wabamun 19S to 234L tap normally open (operating condition)	December 31, 2017
Two new 138 kV lines between 780L and Cooking Lake and, reconfiguration	3	Two new 138 kV circuits, 780L to Cooking Lake 522S, and augmentation of Cooking Lake 522S Substation (upgrades existing bus, addition of circuit breakers with isolating switches)	December 31, 2017
New Saunders Lake Substation	2	New Saunders Lake 289S substation including two 240/138 kV 400 MVA transformers; modifications to Nisku 149S, Wetaskiwin 40S and Ellerslie 89S; proposed Wolf Creek 288S, Bigstone 86S; four new 240 kV lines, two new 138 kV lines, and rebuild 780L and 858L between Nisku and Saunders Lake	December 31, 2017
New Harry Smith Substation	1	New 240/138kV Harry Smith 367S substation including two 240/138 kV 400 MVA transformers; modifications to Acheson 305S, Stony Plain 434S and Keephills 320P substations; two new 240 kV lines, and three new 138 kV lines	December 31, 2017
New EPCOR scope of work	N/A	P&C line renumbering	December 31, 2017

THE TRANSMISSION FACILITY OWNER(S): AltaLink.

PROJECT COST:

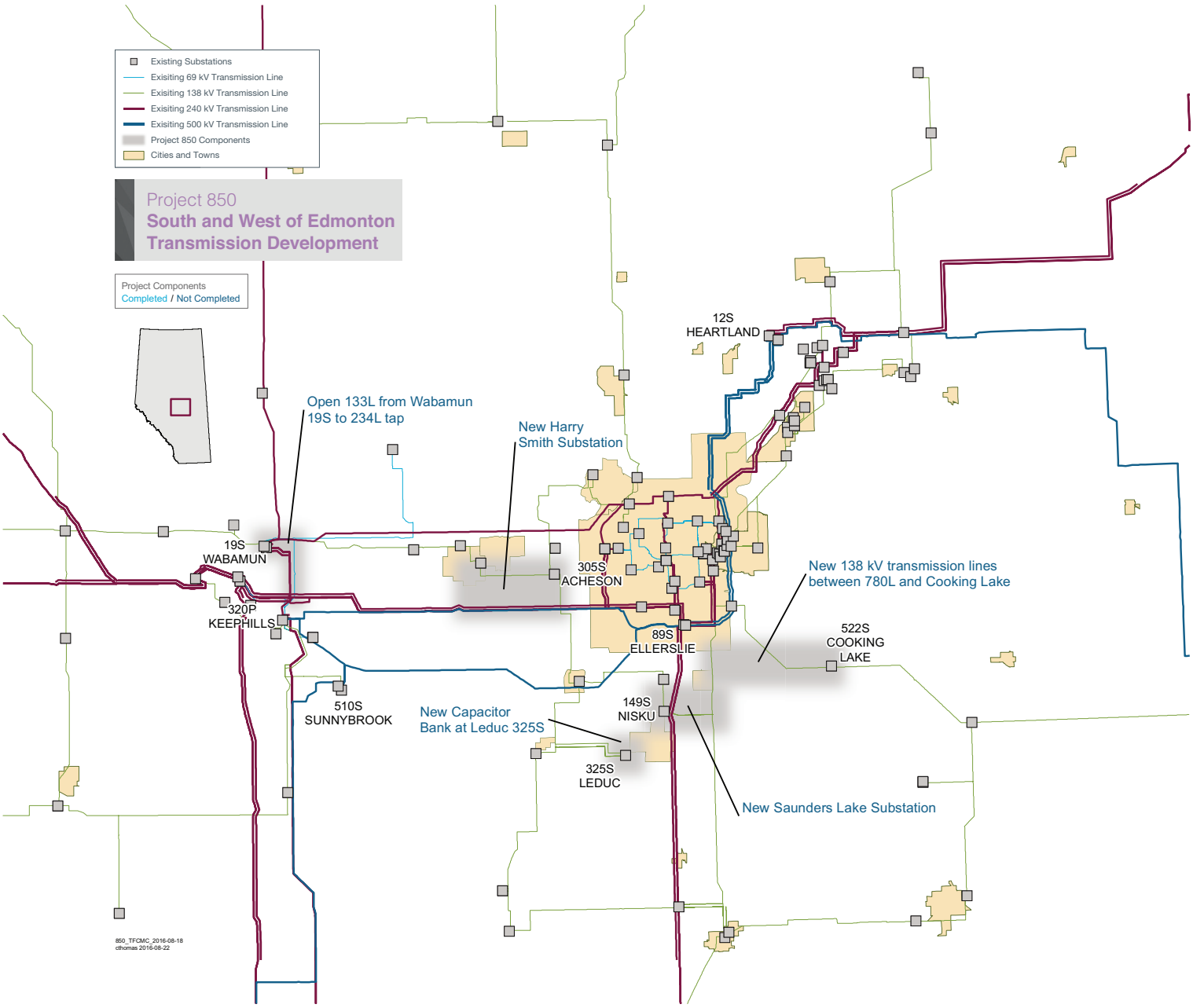
TRANSMISSION PROJECT	AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST	CURRENT ESTIMATED COST
South and West of Edmonton Transmission Development	**$194 Million** (2013$)	**$306.6 Million** (ISD$ with escalation)

CURRENT STATUS: In October 2015, AltaLink filed two FAs with the AUC.

Hearings for both Harry Smith and Leduc-Strathcona County area developments were completed in May 2016. On July 15, 2016 the AUC provided Permit and Licence (P&L) to the Cooking Lake, Saunders Lake, Wabamun and Leduc developments. AltaLink is awaiting the AUC's P&L for the Harry Smith developments, and this is expected by August 2016.

PROJECT RISKS

The project's ISD may be delayed depending on the FA approval dates and scope.


Existing Substations
Exisiting 69 kV Transmission Line
Exisiting 138 kV Transmission Line
Exisiting 240 kV Transmission Line
Exisiting 500 kV Transmission Line
Project 850 Components
Cities and Towns
Project 850
South and West of Edmonton
Transmission Development
Project Components
Completed / Not Completed
12S
HEARTLAND
Open 133L from Wabamun
19S to 234L tap
New Harry
Smith Substation
19S
WABAMUN
320P
KEEPHILLS
305S
ACHESON
New 138 kV transmission lines
between 780L and Cooking Lake
89S
ELLERSLIE
522S
COOKING
LAKE
510S
SUNNYBROOK
New Capacitor
Bank at Leduc 325S
149S
NISKU
325S
LEDUC
New Saunders Lake Substation
850_TFCMC_2016-08-18
cthomas 2016-08-22

7. **SOUTHERN ALBERTA TRANSMISSION REINFORCEMENT (SATR);** PROJECT 787 – To accommodate wind generation in southern Alberta.

THE PROJECT: The existing capacity of the transmission system in southern Alberta is insufficient to provide adequate system access for the interconnection of additional wind-powered generation. Additional substations and upgrades to existing facilities are required. The AESO originally outlined the need for a 240 kV AC looped system with three stages of implementation.

THE COMPONENTS: The project includes three stages of development.

Stage 1: COMPLETED – To reinforce the 240 kV system in the Fort MacLeod and the Brooks–Medicine Hat corridor.

Stage 2: To reinforce the 240 kV and 138 kV systems in the Glenwood, Lethbridge, Blackie and City of Medicine Hat areas, including a 240 kV system loop connection to the 500 kV Langdon–Cranbrook line.

Stage 3: CANCELLED – Interconnect the Ware Junction–Langdon area via a 240 kV line.

FACILITY APPLICATION NAME	FACILITY APPLICATION NUMBER	FACILITY APPLICATION DESCRIPTION	FORECAST OR ACTUAL IN-SERVICE DATE
Milo Junction Switching Station	2	Build a switching station at Milo Junction	November 1, 2011
PST Addition at Russell 632S	3	Phase shifting transformer and new Russell substation	April 25, 2012
Ware Junction Substation upgrade	13	933L line in/out at Ware Junction	October 4, 2013
Cassils to East Medicine Hat	4	240 kV lines from Cassils to new Bowmanton	November 27, 2013
East Medicine Hat to Whitla 240 kV Transmission Line	5	240 kV lines from Bowmanton to new Whitla	March 25, 2014
911L Line Replacement	1	Build new 240 kV lines from Foothills substation to Windy Flats substation	August 21, 2015
Blackie Area 138 kV upgrade	11	138 kV system upgrade in the Blackie area	May 28, 2016
Medicine Hat Area 138 kV Line Development	6	138 kV system upgrades in the Medicine Hat area	December 7, 2016
Castle Rock Ridge to Chapel Rock 240 kV Line	7	240 kV Line from Goose Lake to new Chapel Rock 500 kV substation	TO BE DETERMINED
Etzikom Coulee S/S and 240 kV Line to Picture Butte S/S	8	240 kV line from Etzikom Coulee to Picture Butte (formerly called MATL) substation	ON HOLD
240 kV Line from Etzikom Coulee to Goose Lake	9	240 kV line from Etzikom Coulee substation to Goose Lake substation	ON HOLD
Etzikom Coulee S/S to Whitla 240 kV Line	10	240 kV line from Journault to Whitla substation	ON HOLD
Cypress Reactive Power Addition	12	Reactive power addition at Cypress 562S substation	ON HOLD

THE TRANSMISSION FACILITY OWNER(S): AltaLink.

PROJECT COST:

TRANSMISSION PROJECT	AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST	CURRENT ESTIMATED COST
Southern Alberta Transmission Reinforcement	**$2.493 Billion** (2013$)	**$1.866 Billion** (ISD$ with escalation)

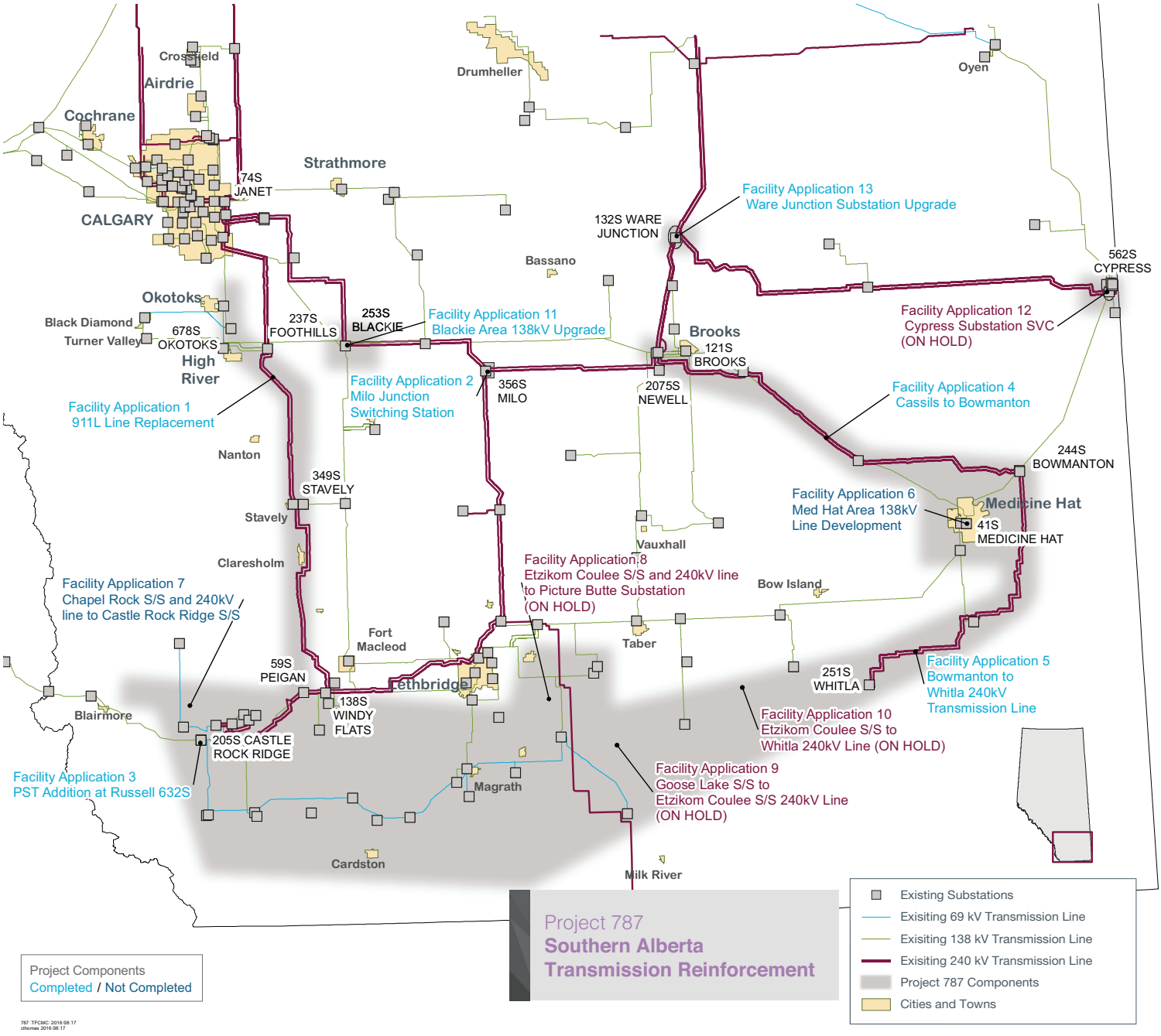
CURRENT STATUS: Stage 1 has been completed.

As reported in the December 2015 TFCMC Report, the scope for Stage 2 includes eight FAs: one FA has been energized, two have received AUC approval and are under construction, one more is currently being prepared by AltaLink and four FAs have been stopped (the timing of these applications is being re-evaluated by the AESO).

Stage 3 has been cancelled.

PROJECT RISKS

The project elements are under review and adjustments may be required based on need and timing.


Crossfield
Airdrie
Cochrane
CALGARY
Strathmore
74S
JANET
Drumheller
Oyen
Facility Application 13
Ware Junction Substation Upgrade
132S WARE
JUNCTION
Bassano
562S
CYPRESS
Facility Application 12
Cypress Substation SVC
(ON HOLD)
Okotoks
Black Diamond
Turner Valley
678S
OKOTOKS
237S
FOOTHILLS
253S
BLACKIE
Facility Application 11
Blackie Area 138kV Upgrade
Brooks
121S
BROOKS
High
River
Facility Application 1
911L Line Replacement
Facility Application 2
Milo Junction
Switching Station
356S
MILO
2075S
NEWELL
Facility Application 4
Cassils to Bowmanton
Nanton
244S
BOWMANTON
349S
STAVELY
Facility Application 6
Med Hat Area 138kV
Line Development
Medicine Hat
41S
MEDICINE HAT
Stavely
Vauxhall
Claresholm
Facility Application 8
Etzikom Coulee S/S and 240kV line
to Picture Butte Substation
(ON HOLD)
Bow Island
Facility Application 7
Chapel Rock S/S and 240kV
line to Castle Rock Ridge S/S
Fort
Macleod
Taber
59S
PEIGAN
Lethbridge
251S
WHITLA
Facility Application 5
Bowmanton to
Whitla 240kV
Transmission Line
Blairmore
138S
WINDY
FLATS
205S CASTLE
ROCK RIDGE
Facility Application 10
Etzikom Coulee S/S to
Whitla 240kV Line (ON HOLD)
Facility Application 3
PST Addition at Russell 632S
Magrath
Facility Application 9
Goose Lake S/S to
Etzikom Coulee S/S 240kV Line
(ON HOLD)
Cardston
Milk River
Project 787
Southern Alberta
Transmission Reinforcement
Project Components
Completed / Not Completed
Existing Substations
Exisiting 69 kV Transmission Line
Exisiting 138 kV Transmission Line
Exisiting 240 kV Transmission Line
Project 787 Components
Cities and Towns

8. **THICKWOOD HILLS 240 KV TRANSMISSION DEVELOPMENT AND REACTIVE POWER REINFORCEMENT (THTD);** PROJECT 1186 – To connect the Fort McMurray West 500 kV transmission project to the existing transmission system in the Thickwood Hills area, west of Fort McMurray.

THE PROJECT: This consists of a 240 kV substation and reactive power reinforcement for the 500 kV Fort McMurray West project. The present requested ISD is the fourth quarter of 2018, which is at least six months ahead of the 500 kV West Line.

THE COMPONENTS: The project includes the construction of a new 240 kV substation that will terminate four 240 kV lines and also includes the construction of approximately 20 km of new double-circuit 240 kV line.

FACILITY APPLICATION NAME	FACILITY APPLICATION NUMBER	FACILITY APPLICATION DESCRIPTION	FORECAST OR ACTUAL IN-SERVICE DATE
Thickwood	1	Construct a new 240 kV substation and 20 km of 240 kV double-circuit line	October 1, 2018

THE TRANSMISSION FACILITY OWNER(S): ATCO.

PROJECT COST:

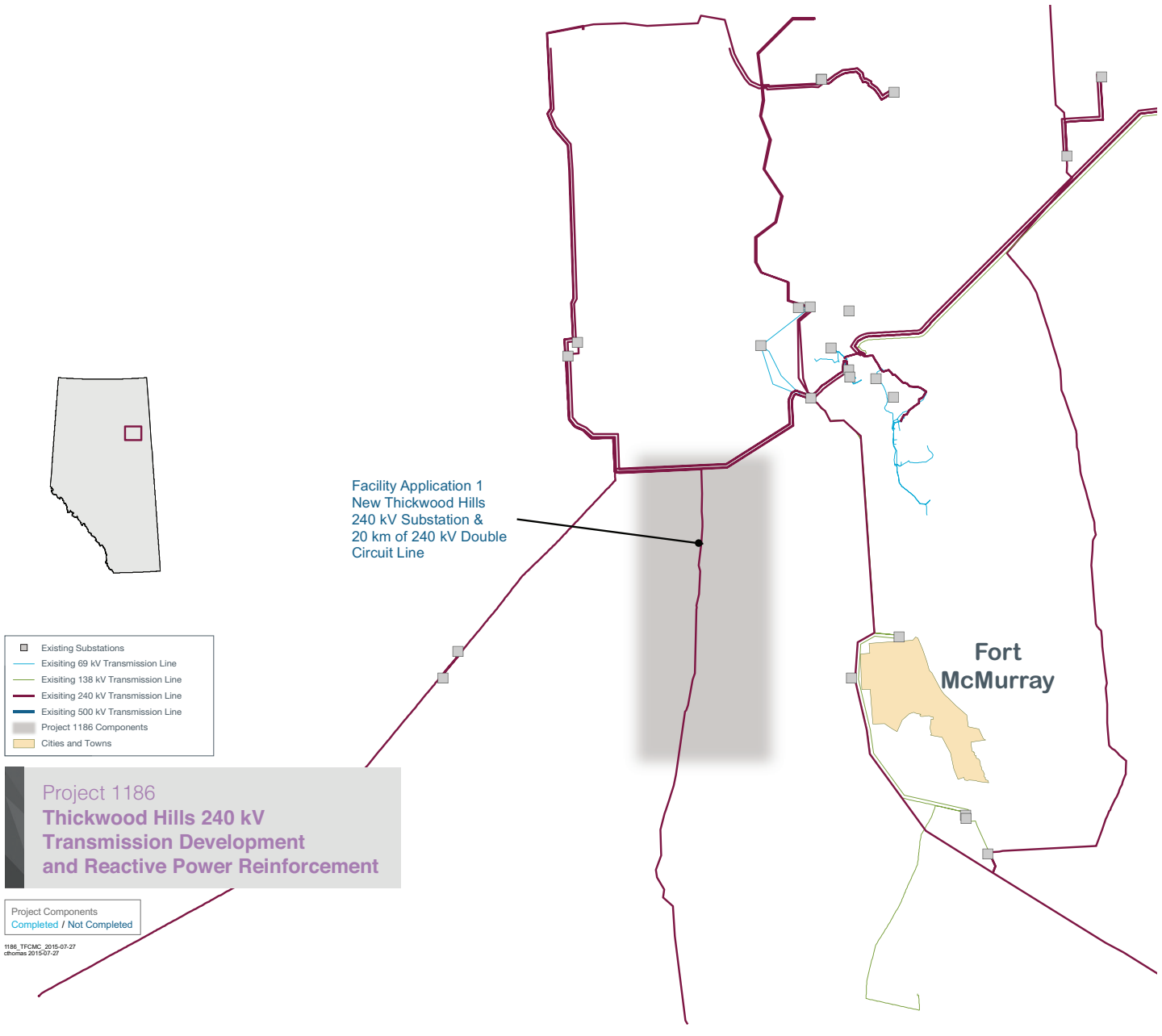
TRANSMISSION PROJECT	AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST	CURRENT ESTIMATED COST
Thickwood Hills 240 kV Transmission Development and Reactive Power Reinforcement	**Not Applicable**[11]	**$132.43 Million** (ISD$ with escalation)

CURRENT STATUS: The AESO filed the NID on December 16, 2014, and received approval on March 12, 2015. ATCO filed their FA on December 11, 2015. FA approval is expected to coincide with the 500 kV Fort McMurray West approval in the first quarter of 2017.

PROJECT RISKS

There are no risks to report at this time.

11 The 'Not Applicable' entry is because the costs for this project were not broken out in the AESO Long-Term Transmission Plan that was filed in January 2014.


Facility Application 1
New Thickwood Hills
240 kV Substation &
20 km of 240 kV Double
Circuit Line
Fort
McMurray
Existing Substations
Exisiting 69 kV Transmission Line
Exisiting 138 kV Transmission Line
Exisiting 240 kV Transmission Line
Exisiting 500 kV Transmission Line
Project 1186 Components
Cities and Towns
Project 1186
Thickwood Hills 240 kV
Transmission Development
and Reactive Power Reinforcement
Project Components
Completed / Not Completed
1186_TFCMC_2015-07-27
clhomas 2015-07-27

Appendix C: Previously Monitored Projects

Since the TFCMC began its deliberations, the Committee has monitored a total of 19 different transmission projects. To date, 10 of the projects have been completed, or are in service, and for the purpose of TFCMC reporting are considered closed. Those undertakings, and their final costs, are below. Projects are listed alphabetically.

- **ALBERTA INDUSTRIAL HEARTLAND BULK TRANSMISSION DEVELOPMENT (HBTD);** PROJECT 629 – Construction of a double-circuit 500 kV transmission line, connecting the Heartland region (northeast of Fort Saskatchewan) to existing 500 kV transmission facilities in the Edmonton area.

  NID Estimate: Not Available[12] | Service Proposal Estimate: $580.7 million | Final Project Cost: $699.5 million[13] |

  Removed from monitoring: TFCMC December 2014 Report

- **CHRISTINA LAKE AREA 240 KV TRANSMISSION DEVELOPMENT (CHL);** PROJECT 1101 – Transmission facilities serving new oilsands developments and enhanced reliability to existing oilsands operations.

  NID Estimate: $406.6 million | Service Proposal Estimate: $418.9 million | Estimated Final Project Cost: $481 million[14] |

  Removed from monitoring: TFCMC December 2015 Report

- **EAST CALGARY TRANSMISSION PROJECT AND ENMAX SHEPARD ENERGY CENTRE CONNECTION (ECTP);** PROJECT 719 – Serving growing demand for electricity in the Calgary and High River planning areas and an interconnection to the ENMAX Shepard Energy Centre.

  NID Estimate: $132.6 million | Service Proposal Estimate: $136.3 million | Estimated Final Project Cost: $164.26 million[15] |

  Removed from monitoring: TFCMC December 2015 Report

- **ENMAX NO. 65 SUBSTATION (ESCS);** PROJECT 922[16] – New 240 kV substation in south Calgary and 138 kV development due to overloading in south Calgary.

  NID Estimate: Not Available[17] | Service Proposal Estimate: $38 million | Final Project Cost: $45 million | AESO 2012 LTP Estimated Cost: $37 million |

  Removed from monitoring: TFCMC June 2014 Report

12 A NID Estimate was not available. However, the Alberta Electric System Operator's (AESO) Long-Term Plan (LTP) showed a cost of $613 million in 2013 dollars.

13 The final cost for this project is $699,495,464.

14 The AESO is awaiting the final costs for this project. This amount will be updated once it is available.

15 The AESO is awaiting the final costs for this project. This amount will be updated once it is available.

16 The TFCMC monitored Project 922, ENMAX No. 65 Substation. While the current value of the project is below the $100-million TFCMC threshold, the original project initially came in above the threshold and this is why the Committee kept it on its list of monitored projects.

17 A NID Estimate was not available. However, the AESO LTP showed a cost of $37 million in 2011 dollars.

◊ **FOOTHILLS AREA TRANSMISSION DEVELOPMENT (FATD) – EAST PROJECT;** PROJECT 1117 – Serving growing demand in South Calgary, High River and the surrounding area.

Part of the overall FATD project, which is estimated to cost $921 million according to the AESO's LTP plan filed in January 2014.

NID Estimate: Not Applicable[18] | Service Proposal Estimate: $443.5 million | Estimated Final Project Cost: $465.23 million[19] |

Removed from monitoring: TFCMC December 2015 Report

◊ **HANNA REGION TRANSMISSION DEVELOPMENT (HATD);** PROJECT 812 – Transmission development in the Hanna, Sheerness and Battle River areas.

NID Estimate: $983 million | Service Proposal Estimate: $940.9 million | Final Project Cost: $997.3 million[20] |

Removed from monitoring: TFCMC June 2015 Report

◊ **NORTH SOUTH TRANSMISSION REINFORCEMENT (HVDC);** PROJECT 737 – Construction of two 500 kV HVDC transmission lines from the Edmonton area to the Calgary and south regions.

NID Estimate: Not Available[21] | Service Proposal Estimate: $3.058 billion | Estimated Final Project Cost: $3.6 billion[22] |

Removed from monitoring: TFCMC December 2015 Report

◊ **NORTH FORT MCMURRAY TRANSMISSION DEVELOPMENT (NFMD);** PROJECT 791 – Transmission development relieving constraints and for forecast demand north of Fort McMurray.

NID Estimate: $237.44 million | Service Proposal Estimate: $237.44 million | Final Project Cost: $352.3 million |

Removed from monitoring: TFCMC June 2014 Report

◊ **NORTHWEST TRANSMISSION DEVELOPMENT (NWTD);** PROJECT 535 – Transmission expansion and enhancement in northwest Alberta.

NID Estimate: $262 million[23] | Service Proposal Estimate: $669.4 million | Final Project Cost: $583 million |

Removed from monitoring: TFCMC December 2013 Report

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18 For this project, the TFO was not requested to provide NID cost estimates. Rather both AltaLink and ENMAX were directed to provide Service Proposal Estimates. The AESO used this estimate in its NID application and the TFOs used these estimates when they filed their Facility Applications.

19 The AESO is awaiting the final costs for this project. This amount will be updated once it is available.

20 The final cost for this project is $997,264,513.

21 A NID Estimate was not available. However, the AESO LTP showed a cost of $3.164 billion in 2013 dollars.

22 The AESO is awaiting the final costs for this project. This amount will be updated once it is available.

23 In the June 2011 TFCMC Report it was reported that the need for this project was recognized in March 2006 and the need approval was granted in August 2006 with the total project scope envisioned at $262 million. However, due to project scope changes, the value increased.

◊ **SOUTHERN ALBERTA TRANSMISSION DEVELOPMENT (SATD);** PROJECT 416 – Transmission development in Goose Lake-Peigan and North Lethbridge region.

NID Estimate: $77 million | Service Proposal Estimate: $91 million | Final Project Cost: $238 million |

Removed from monitoring: TFCMC June 2013 Report

◊ **YELLOWHEAD AREA TRANSMISSION DEVELOPMENT (YATD);** PROJECT 671 – Serving increased electricity demand; replaced aging infrastructure, and improved reliability for the Drayton Valley, Hinton, Edson and Alberta Beach areas.

NID Estimate: $84 million | Service Proposal Estimate: $126 million | Final Project Cost: $141 million[24] |

Removed from monitoring: TFCMC December 2013 Report

24 The estimated final cost of this project was $148 million, as noted in the December 2013 TFCMC Report – at that time, final costs were not available. The actual final cost came in at $140,652,893.

Appendix D: TFCMC Working Documents

TThe TFCMC receives reports and cost summary updates, on a monthly basis, in order to better understand the costs and changes associated with the transmission projects it monitors. In this part of the report, samples of the cost summary updates are included to provide readers with a better insight as to the type of material the TFCMC studies.

The cost summaries on the following pages are just a portion of the individual documents, which also include detailed information on authorized cost changes and cost estimate changes from the Needs Identification Document (NID) phase to the Service Proposal Estimate stage.

As the documents on the following pages are an example, or working documents, of just some of the material the TFCMC reviews, there could be cost discrepancies between Appendices B and D on a particular project. Please refer to Appendix B for the most recent and accurate estimated cost figures.

Project Cost Reporting for TFCMC, Project 786: Edmonton Region 240 kV Line Upgrades (ERLU); May 2016 Meeting

Project: 786 Cost Summary for [Edmonton Region 240 kV Line Upgrades] Refreshed @ 11/05/2016 13:40:41

Project #	NID name	NID Filing Date	NID Approval Date	NID Estimated Cost	PPS Estimated Cost	Authorized Cost Change	Authorized Budget'	Total Changes	Percent Change of Auth
786	Edmonton Region 240 kV Line Upgrades	2008-08-26	2009-02-24	125.41M	155.03M	23.31M	178.34M	25	13.1%

Project 786 Details by FA

TFO	Cost Grouping	FA #	FA name	Stage	Facility Application Filing Date	Facility Application Approval Date	Overall Facility ISD	PPS Estimated Cost	Authorized Cost Changes	Authorized Budget	No Of Changes'	Percent Change Of Auth'
AltaLink	1,2,4,5	1	AML Keephills Substation Addition (Formerly P953)	6	2009-11-06	2010-03-19	2010-07-31	101.35M	12.66M	114.01M	19	11.1%
		2	AML Rebuild 240kV 904L (1043L)	5	2010-07-28	2011-08-12	2016-11-30					
		4	AML 902L Restring & 909L Retermination (Formerly P1057)	5	2011-08-05	2012-10-31	2016-08-01					
		5	AML 908L, 909L Restring (Formerly P1058)	6	2009-09-13	2010-02-10	2011-03-20					
ATCO	7	7	ATCO Phase Shifter (Formerly P957)	6	2009-09-14	2010-03-25	2013-08-20	31.52M	8.00M	39.51M	3	20.2%
EPCOR	3	3	EPCOR 1044EL, 1045EL (Formerly P955)	6	2010-10-15	2011-08-12	2012-02-29	7.97M	0.00M	7.97M	0	0.0%
	6	6	Epoch Jasper, Petrolia (Formerly P955)	6	2010-04-15	2010-06-16	2011-06-14	4.55M	2.65M	7.20M	3	36.8%
TransA..	8	8	TransAlta 902L	6	2011-08-05	2012-10-31	2014-11-12	9.65M	0.00M	9.65M	0	0.0%

Comments

TransAlta and the Enoch FN have completed an agreement and AltaLink is scheduled to complete the work by November 30, 2016.

Project Cost Reporting for TFCMC, Project 787: Southern Alberta Transmission Reinforcement (SATR); May 2016 Meeting

Project: 787 Cost Summary for [Southern Alberta Transmission Reinforcement] Refreshed @ 11/05/2016 13:40:41

Project #	NID name	NID Filing Date	NID Approval Date	NID Estimated Cost	PPS Estimated Cost	Authorized Cost Change	Authorized Budget'	Total Changes	Percent Change of Auth
787	Southern Alberta Transmission Reinforcement	2008-12-30	2009-09-17	3,442.90M	1,415.62M	(14.94M)	1,400.67M	52	-1.1%

Project 787 Details by FA

TFO	Cost Grouping	FA #	FA name	Stage	Facility Application Filing Date	Facility Application Approval Date	Overall Facility ISD	PPS Estimated Cost	Authorized Cost Changes	Authorized Budget	No Of Changes'	Percent Change Of Auth'
AltaLink		7	Castle Rock Ridge to Chapel Rock 240 kV Line (Formerly P1034)	4	2016-05-13	2017-06-13	2019-06-28					
		8	Etzikom Coulee S/S and 240kV line to Picture Butte S/S (Formerly P1035)	4	2016-11-15	2017-11-15	2020-01-01					
		9	Goose Lake S/S to Etzikom Coulee S/S 240kV Line (Formerly P1036)	4	2017-03-23	2017-06-10	2020-01-01					
		10	Etzikom Coulee S/S to Whitla 240kV Line (Formerly P1037)	4	2016-11-11	2017-11-13	2020-01-01					
		12	Reactive Power Addition to Cypress 562S (Formerly P1039)	4	2016-09-14	2017-01-04	2017-04-28					
	1	1	911L Line Replacement (Formerly P882)	6	2012-09-25	2013-11-11	2015-08-21	440.17M	-0.43M	439.74M	15	-0.1%
	2	2	Milo Junction Switching Station (Formerly P883)	6	2009-12-21	2010-08-05	2011-11-01	29.70M	0.47M	30.17M	4	1.6%
	3	3	PST Addition at Russell 632S (Formerly P884)	6	2010-08-27	2011-01-12	2012-04-25	17.21M	-0.08M	17.13M	1	-0.5%
	4	4	Cassils to Bowmanton (Formerly P886)	6	2010-07-27	2011-06-08	2013-11-27	407.91M	-28.10M	379.81M	4	-7.4%
	5	5	Bowmanton to Whitla 240kV Transmission Line (Formerly P887)	6	2010-07-27	2011-06-08	2014-03-25	352.75M	-41.77M	310.98M	3	-13.4%
	6	6	Med Hat Area 138kV Line Development (Formerly P888)	5	2012-12-03	2013-10-18	2016-12-09	120.29M	51.77M	172.06M	17	30.1%
	11	11	Blackie Area 138kV Upgrade (Formerly P1038)	6	2014-09-11	2015-01-16	2016-05-28	41.45M	2.73M	44.18M	5	6.2%
	13	13	Ware Junction Substation Upgrade (Formerly P1040)	6	2011-04-05	2012-02-06	2013-10-04	6.13M	0.47M	6.61M	3	7.2%

Comments

The service proposal estimate FA#7 has been excluded from this report until approved by the AESO.

Project Cost Reporting for TFCMC, Project 811: Central East Area Transmission Development (CETD); May 2016 Meeting

Project: 811 Cost Summary for [Central East Area Transmission Development] Refreshed @ 11/05/2016 13:40:41

Project #	NID name	NID Filing Date	NID Approval Date	NID Estimated Cost	PPS Estimated Cost	Authorized Cost Change	Authorized Budget'	Total Changes	Percent Change of Auth
811	Central East Area Transmission Development	2010-05-17	2011-02-10	431.00M	243.39M	100.59M	343.98M	10	29.2%

Project 811 Details by FA

TFO	Cost Grouping	FA #	FA name	Stage	Facility Application Filing Date	Facility Application Approval Date	Overall Facility ISD	PPS Estimated Cost	Authorized Cost Changes	Authorized Budget	No Of Changes'	Percent Change Of Auth'
ATCO	1,2	1	FA 1 - Cold Lake Area 144 kV Reinforcements	6	2012-03-07	2012-12-11	2014-01-30	141.08M	54.83M	195.92M	3	28.0%
		2	FA 2 - Bonnyville 700S and 7L146	5	2012-04-27	2013-07-02	2017-02-01					
	3,4,5	3	FA 3 - St. Paul Area Upgrades - Watt Lake 956S	6	2011-12-23	2013-03-27	2013-12-12	50.85M	31.92M	82.77M	2	38.6%
		4	FA 4 - St. Paul Area Upgrades - St. Paul 707S and 7L139/7L70 in/out	5	2012-07-12	2013-12-20	2016-06-21					
		5	FA 5 - St. Paul Area Upgrades - Whitby Lake 819S 144kV CB Addition	6	2011-12-23	2012-04-20	2014-06-25					
	6	6	FA 6 - Vermillion 710S Substation Upgrade	6	2011-10-24	2012-05-16	2013-09-15	6.70M	2.92M	9.62M	1	30.4%
	7,8	7	FA 7 - Heisler Area Upgrades	6	2011-12-23	2012-02-27	2013-07-27	31.48M	10.91M	42.39M	4	25.7%
		8	FA 8 - Kitscoty Area Upgrades	6	2012-06-13	2013-01-02	2014-12-04					
	10	10	FA 10 - 7L701 Line Clearance Mitigation (Letter of Enquiry)	6	2011-10-24	2012-02-27	2012-07-18	13.28M	0.00M	13.28M	0	0.0%

Comments

No changes to report.

Project Cost Reporting for TFCMC, Project 813: Red Deer Region Transmission Development (RDTD); May 2016 Meeting

Project: 813 Cost Summary for [Red Deer Area Transmission Development] Refreshed @ 11/05/2016 13:40:41

Project #	NID name	NID Filing Date	NID Approval Date	NID Estimated Cost	PPS Estimated Cost	Authorized Cost Change	Authorized Budget'	Total Changes	Percent Change of Auth
813	Red Deer Area Transmission Development	2011-07-20	2012-04-10	222.80M	337.50M	66.91M	404.41M	65	16.5%

Project 813 Details by FA

TFO	Cost Grouping	FA #	FA name	Stage	Facility Application Filing Date	Facility Application Approval Date	Overall Facility ISD	PPS Estimated Cost	Authorized Cost Changes	Authorized Budget	No Of Changes'	Percent Change Of Auth'
AltaLink		5	RDATD Facility Application 5 - Salvage	4	2016-08-30	2016-11-22	2017-04-13					
		7	RDATD Facility Application 7 - Stage II 2017 Facilities	4	2017-10-18	2018-05-02	2018-10-31					
	1	1	RDATD Facility Application 1 - Brownfields	6	2011-09-26	2012-09-27	2013-11-28	20.72M	10.96M	31.68M	16	34.6%
	2	2	RDATD Facility Application 2 - Rebuilds	5	2013-06-18	2014-07-28	2017-02-01	137.30M	25.26M	162.56M	22	15.5%
	3,6	3	RDATD Facility Application 3 - Greenfields	5	2013-06-18	2014-07-28	2017-03-30	179.48M	30.69M	210.17M	27	14.6%
		6	RDATD Facility Application 6 - 423L	Null	2013-06-18	2015-11-27						

Comments

No changes to report.

Project Cost Reporting for TFCMC, Project 850: South and West of Edmonton Transmission Development (SWEATR); May 2016 Meeting

Project: 850 Cost Summary for [South and West of Edmonton Transmission Development] Refreshed @ 11/05/2016 13:40:41

Project #	NID name	NID Filing Date	NID Approval Date	NID Estimated Cost	PPS Estimated Cost	Authorized Cost Change	Authorized Budget'	Total Changes	Percent Change of Auth
850	South and West of Edmonton Transmission Development	2012-12-14	2014-05-05	172.17M	306.61M	0.00M	306.61M	0	0.0%

Project 850 Details by FA

TFO	Cost Grouping	FA #	FA name	Stage	Facility Application Filing Date	Facility Application Approval Date	Overall Facility ISD	PPS Estimated Cost	Authorized Cost Changes	Authorized Budget	No Of Changes'	Percent Change Of Auth'
AltaLink	1,2	1	Facility Application 1 - Cooking Lake - Saunders Lake - Leduc - Wabamun	4	2015-10-16	2016-07-28	2017-12-31	306.43M	0.00M	306.43M	0	0.0%
		2	Facility Application 2 -Harry Smith Development	4	2015-10-30	2016-08-14	2018-01-24					
EPCOR	6	6	FA6 - EPCOR P&C and Line Renumbering (Facility Application Not Required)	4	2015-04-02	2015-04-02	2017-12-31	0.17M	0.00M	0.17M	0	0.0%

Comments

The AUC scheduled hearings for AltaLink's Facility Application #1 (Cooking Lake, Saunders Lake, Wabamun and Leduc Developments) took place between April 25 to 29, 2016. The hearing for Facility Application #2 (Harry Smith Development) is scheduled from May 10 to 13, 2016.

Construction is forecast to start in Q3 2016.

Project Cost Reporting for TFCMC, Project 1186: Thickwood Hills 240 kV Transmission Development and Reactive Power Reinforcement (THTD); May 2016 Meeting

Project: 1186 Cost Summary for [Thickwood Hills 240 kV Transmission Development and Reactive Power Reinforcement] Refreshed @ 11/05/2016 13:40:41

Project #	NID name	NID Filing Date	NID Approval Date	NID Estimated Cost	PPS Estimated Cost	Authorized Cost Change	Authorized Budget'	Total Changes	Percent Change of Auth
1186	Thickwood Hills 240 kV Transmission Development and Reactive ..	2014-12-16	2015-03-12	156.84M	132.43M	0.00M	132.43M	0	0.0%

Project 1186 Details by FA

TFO	Cost Grouping	FA #	FA name	Stage	Facility Application Filing Date	Facility Application Approval Date	Overall Facility ISD	PPS Estimated Cost	Authorized Cost Changes	Authorized Budget	No Of Changes'	Percent Change Of Auth'
ATCO	1	1	Thickwood	4	2015-12-11	2016-08-18	2018-10-01	132.43M	0.00M	132.43M	0	0.0%

Comments

ATCO Facility Application pending AUC approval.

Appendix E: Transmission Facility Owners Responses

Under the TFCMC's mandate, the Committee shall allow Transmission Facility Owners (TFOs) to review and provide written comments on any report produced that references a TFO or a project a TFO is developing. The following responses were received in regards to the June 2016 Report.

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY
2611 3rd Ave SE, Calgary, Alberta, T2A 7W7
www.altalink.ca

October 31, 2016

Henry Yip
Transmission Cost Monitoring Committee
Email:hcyip@telus.net

Subject: 11th Semi Annual Transmission Cost Monitoring Committee Report

Henry,

Thank you for the opportunity to review the TFCMC's eleventh semi-annual Transmission Cost Monitoring Committee Report. AltaLink continues to be supportive of reviewing project progress with the TFCMC in order to provide customer associations more visibility to project costs.

In the report you requested feedback on procurement practises for materials and construction labor. From your review of this subject you have put forward 8 principles for effective procurement. I can confirm that in general AltaLink adheres to these principles as good basic procurement practices in the cost effective execution of projects. We have demonstrated our use of these practices in our 2013/14 Deferral Account Application which was heard by the Commission in Q4 of last year. The only area that we did not pursue is the development of our own construction crews for the large project construction. The fluctuations in construction volumes and timing do not make this a cost effective option for AltaLink.

AltaLink supports the Climate Leadership Plan (CLP) and strongly supports your recommendation to government that existing transmission capacity should be used as a basis for the development of the Climate Leadership Plan. We believe that the investments already incurred through the last five years have well positioned the grid to meet the Government's needs to execute the CLP. In other words, minimal additional investment is required to support the plan if the systems planner optimize their solutions around what transmission exists today. This should lead to the least cost outcome for ratepayers and all Albertans.

With this said, AltaLink no longer supports the recommendation for the extension of the COM pilot even in a limited form to review Pre-Nid projects. The mandate of the COM has been to review project developments greater than $100M in size. Given the assessment that limited new transmission is required, it is not logical to support the additional expense of staffing an organization without portfolio. There is no expectation that new large system transmission projects (>$100M) will be warranted in the AESO long range plan or in this economic climate.

In closing, I am happy to report that we completed the Edmonton Region project in September 2016, 2 months ahead of the revised schedule. The remaining portion of the project which crossed the Enoch First Nations land was completed safely and is now providing valuable reliability support to the Edmonton area.

Thanks you again for the opportunity to comment on the report. Please feel free to contact me if you require any additional information.

Regards,

Johanne Picard-Thompson
SVP Projects, AltaLink

cc Greg Retzer, VP AESO

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Transmission Facility Owners Responses

2000 – 10423 101 St NW, Edmonton, AB
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epcor.com

October 31, 2016

Henry Yip, Chair
Transmission Facilities Cost Monitoring Committee
Email: hcyip@telus.net

Dear Mr. Yip:

RE: TFCMC June 2016 Report

EDTI appreciates the opportunity to review and comment on the June 2016 Report from the Transmission Facilities Cost Monitoring Committee (the "Committee").

As stated in our comments to previous reports, EDTI remains supportive of the Committee and its efforts to understand Alberta transmission infrastructure projects and the various factors that can impact the cost, scope and schedule of these projects.

If you have any questions about EDTI's comments, please do not hesitate to contact me at 780-441-7109.

Regards,

<original signed>

Saqib Chaudhary
Director, Regulatory Affairs & Business Planning
EPCOR Distribution & Transmission Inc.

Notes

JUNE 2016 REPORT
TFCMC@gov.ab.ca

Electronic versions of the TFCMC reports can be found at:
ucahelps.alberta.ca/regulatory-reporting.aspx

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